

— EXHIBIT 6 —

In The Matter Of:

CARE

vs.

Cow Palace

Deposition of

Robert Lawrence, M.D.

October 23, 2014



Central Court Reporting

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A P P E A R A N C E S		P R O C E E D I N G S	
ON BEHALF OF THE PLAINTIFFS:		- - - - -	
CHARLIE TEBBUTT, ESQUIRE		WHEREUPON,	
Law Offices of Charles M. Tebbutt, P.C.		ROBERT S. LAWRENCE, M.D.,	
941 Lawrence Street		A Witness called for examination,	
Eugene, Oregon 97401		having been first duly sworn, was examined and	
541-344-3505 (P) 541-344-3516 (F)		testified as follows:	
charlie.tebbuttlaw.com		EXAMINATION	
ON BEHALF OF THE DEFENDANTS:		BY MR. MONAHAN:	
BRENDAN V. MONAHAN, ESQUIRE		Q. Good morning, Dr. Lawrence.	
Stokes Lawrence Velikanje		A. Good morning.	
Moore & Shore		Q. My name is Brendan Monahan. I'm an	
120 North Naches Avenue		attorney for Cow Palace and Dairy. I'm taking your	
Yakima, Washington 98901		deposition today in the context of a lawsuit that has	
509-853-3000 (P) 509-895-0060 (F)		been commenced by two citizen groups against Cow	
brendan.monahan@stokeslaw.com		Palace Dairy, and I understand you have been retained	
Reported by: Cappy Hallock, RPR, CRR, CLR		as an expert in this case.	
		A. Yes.	
		Q. What I would like to do at the very outset	
		today is to determine just precisely which opinions	
		you intend to offer at trial in the context or in your	
		capacity as an expert.	
		Okay?	
		I've read your report and it is	
		comprehensive and touches on a wide range of issues.	

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<p style="text-align: right;">Page 6</p> <p>1 the environment on a reasonably -- to a reasonable 2 degree of scientific certainty. Excuse me.</p> <p>3 A. I would say that the presence of 4 pharmaceuticals in groundwater is indeed a significant 5 public health threat as part of the larger problem of 6 antibiotic resistance and the problems associated with 7 that that have arisen through industrial food animal 8 production activities.</p> <p>9 Eighty percent of the antibiotics sold in 10 the United States are used in industrial food animal 11 production. We have a significant public health 12 problem of resistant infections in humans. CDC 13 reports on 2 million cases in 2013, 23,000 deaths. So 14 I think in the sense that the presence in the 15 groundwater in the Yakima Valley is a signal that this 16 problem, that we recognize as a national problem, is 17 also present in Yakima.</p> <p>18 Q. I understand that and I respect that. I 19 understand there is a national issue that the science 20 is developing and that Yakima, like many places in the 21 United States, has this public health concern, right?</p> <p>22 A. Yes.</p> <p>23 Q. That is something different, however, than 24 saying, than offering an opinion to a reasonable 25 degree of scientific certainty that the</p>	<p style="text-align: right;">Page 8</p> <p>1 that there is antibiotic resistance as a threat to the 2 people who are exposed to those antibiotics. So in 3 that sense I guess I would by my definition say yes, 4 an imminent public health threat.</p> <p>5 Q. That gives us an extra thing to talk about 6 today.</p> <p>7 A. Okay.</p> <p>8 Q. And I believe I phrased my question in the 9 context of pharmaceuticals.</p> <p>10 A. Well, pharmaceuticals include bacterial 11 agents, antibacterial agents as well as other drugs.</p> <p>12 Q. Okay.</p> <p>13 A. So I was answering in the broad sense.</p> <p>14 Q. All right, so was your answer inclusive 15 also of hormones?</p> <p>16 A. Hormones that may have the potential to act 17 as endocrine disruptors, which is an area of ongoing 18 debate, scientifically, so I would say that the 19 scientific certainty for hormones is not as clear as 20 it is with antibiotics.</p> <p>21 Q. So again, what I would like to do is 22 catalog the opinions and then I'm going to drill into 23 each of them.</p> <p>24 A. Okay.</p> <p>25 Q. Are you or are you not prepared to offer an</p>
<p style="text-align: right;">Page 7</p> <p>1 pharmaceuticals that exist in the Lower Yakima Valley 2 today present a substantial and imminent threat to 3 public health, right?</p> <p>4 A. Well, I understand the distinction that 5 you're making. I think from a public health 6 perspective, I guess I would argue that the presence 7 is part of this larger problem and whether it's going 8 to create a bacterial resistant infection in a Yakima 9 Valley resident tomorrow versus next year versus five 10 years, I'm not prepared to say that that's within the 11 realm of scientific certainty.</p> <p>12 Q. Well, maybe I will phrase it a different 13 way. What are you prepared to say to a reasonable 14 degree of scientific certainty? Because it sounds -- 15 I'm not sure that you and I are saying different 16 things, but I will offer you the opportunity to tell 17 me exactly what it is that you are willing to say to a 18 reasonable degree of scientific certainty presents a 19 substantial and imminent threat to public health or 20 the environment in the Lower Yakima Valley.</p> <p>21 A. I believe, based on work that I have been 22 involved with for a decade now, that wherever you see 23 antibiotics of importance to human medicine in the 24 groundwater coming from a source of excess 25 concentrations of animal manure, that that is a signal</p>	<p style="text-align: right;">Page 9</p> <p>1 opinion to a reasonable degree of scientific certainty 2 that the hormones identified in testing in the Lower 3 Yakima Valley residential wells constitute an imminent 4 and substantial threat to public health or the 5 environment?</p> <p>6 A. I am not.</p> <p>7 Q. Are you or are you not prepared to offer an 8 opinion to a reasonable degree of scientific certainty 9 that the phosphorus that appears in tests in the Lower 10 Yakima Valley residential wells constitutes an 11 imminent or substantial threat to public health or the 12 environment?</p> <p>13 A. To the environment for sure, not to public 14 health.</p> <p>15 Q. And as I see it, or at least as I 16 understand your testimony today you are prepared to 17 offer an opinion that the antibiotics and 18 pharmaceuticals that you have observed in the testing 19 for Lower Yakima Valley wells to a reasonable degree 20 of scientific certainty does present an imminent 21 substantial threat to health and the environment?</p> <p>22 A. Yes.</p> <p>23 Q. Okay.</p> <p>24 One of the --</p> <p>25 MR. TEBBUTT: Before we go on, can we go</p>



<p style="text-align: right;">Page 10</p> <p>1 off the record for just a minute?</p> <p>2 MR. MONAHAN: Sure.</p> <p>3 (Discussion off the record.)</p> <p>4 MR. MONAHAN: Back on the record.</p> <p>5 BY MR. MONAHAN:</p> <p>6 Q. Dr. Lawrence, we just had a few minutes off</p> <p>7 the record to chat and I think I have some helpful</p> <p>8 distinctions now and I will try to narrow down my</p> <p>9 question.</p> <p>10 I understand that the level of usage at Cow</p> <p>11 Palace of pharmaceuticals and antibiotics concerns you</p> <p>12 on a global level in terms of what communities are</p> <p>13 facing across the United States regarding -- regarding</p> <p>14 just problems and health threats associated with large</p> <p>15 scale use of pharmaceuticals and antibiotics, right?</p> <p>16 A. Well, especially the antibiotics.</p> <p>17 Q. Okay.</p> <p>18 A. That's where we have compelling evidence</p> <p>19 that routine use of low dose antibiotics in animals</p> <p>20 raised in confinement creates the perfect condition</p> <p>21 for the emergence of resistance genes through</p> <p>22 spontaneous mutation and that those resistance genes</p> <p>23 in bacteria that are also capable of causing human</p> <p>24 disease spread into the general population. So that's</p> <p>25 my concern. The actual levels of the antibiotics in</p>	<p style="text-align: right;">Page 12</p> <p>1 attribute causation. I believe there are other expert</p> <p>2 opinions who are going to be talking about water flows</p> <p>3 and the dynamics of soil and so forth.</p> <p>4 Q. Very good. And so I was prepared to ask</p> <p>5 you a lot of questions about your background as a</p> <p>6 hydrologist or a geologist, but as long as you're</p> <p>7 leaving that to the other experts, I don't need to</p> <p>8 inquire at that level.</p> <p>9 A. Correct.</p> <p>10 Q. So you are not offering an opinion to a</p> <p>11 reasonable degree of scientific certainty as to</p> <p>12 whether or not the nitrates as they appear in the EPA</p> <p>13 tests or any other testing were caused or -- caused by</p> <p>14 Cow Palace Dairy?</p> <p>15 A. Correct.</p> <p>16 Q. Okay.</p> <p>17 MR. MONAHAN: Off the record.</p> <p>18 (Discussion off the record.)</p> <p>19 BY MR. MONAHAN:</p> <p>20 Q. Well, let's talk about your report. You</p> <p>21 wrote this report, or rather I'm not sure when you</p> <p>22 wrote it, but it was provided to me on or about</p> <p>23 September 20.</p> <p>24 A. Yes.</p> <p>25 Q. And since September 20 there have been a</p>
<p style="text-align: right;">Page 11</p> <p>1 the groundwater of Yakima Valley do not constitute a</p> <p>2 direct threat to human health.</p> <p>3 Q. Got it. So I'm just going to rephrase that</p> <p>4 for the purpose of the record, and that is you are not</p> <p>5 prepared to offer an opinion to a reasonable degree of</p> <p>6 scientific certainty that the levels of antibiotics</p> <p>7 and pharmaceuticals as found in the groundwater in</p> <p>8 Yakima County constitute an imminent and substantial</p> <p>9 threat to health or the environment, correct?</p> <p>10 A. That's correct.</p> <p>11 Q. Okay.</p> <p>12 MR. MONAHAN: Thank you, that saved a lot</p> <p>13 of time.</p> <p>14 MR. TEBBUTT: My pleasure.</p> <p>15 Q. So now let's talk about the concept of</p> <p>16 causation and, as I understand it, and I read through</p> <p>17 your report, you are of the belief or you are</p> <p>18 operating from the premise that the nitrates in</p> <p>19 particular that appear in the residential well tests</p> <p>20 in the EPA report, in the AOC reports, in the ARCADIS</p> <p>21 Report, were related to or in part caused by the</p> <p>22 operations at Cow Palace, right?</p> <p>23 A. I was presented with data obtained by the</p> <p>24 EPA showing elevated levels of nitrates in the</p> <p>25 groundwater. It was not -- I was not asked to</p>	<p style="text-align: right;">Page 13</p> <p>1 flurry of other expert reports. Are you aware of</p> <p>2 that?</p> <p>3 A. Yes.</p> <p>4 Q. Have you been provided with those reports?</p> <p>5 A. I have been provided with the rebuttal</p> <p>6 reports from Paul Anderson and from Mr. Pleus.</p> <p>7 Q. Have you seen a rebuttal report from a</p> <p>8 James Maul?</p> <p>9 A. Yes. I have.</p> <p>10 Q. The Anderson rebuttal in large part</p> <p>11 addresses the antibiotic and pharmaceutical issue.</p> <p>12 And so given your testimony today, I don't think I</p> <p>13 need to ask you any questions about that. Mall in</p> <p>14 large part challenges some of your assumptions, what</p> <p>15 he believes your assumptions were regarding causation</p> <p>16 and also has some concerns about pharmaceuticals and</p> <p>17 antibiotics, so I don't think I need to ask you about</p> <p>18 that one.</p> <p>19 A. Okay.</p> <p>20 Q. Is there anything about the Pleus report</p> <p>21 that you take issue with?</p> <p>22 A. I read with interest his concern about the</p> <p>23 fact that he felt that I had not done a proper risk</p> <p>24 assessment. I'm surrounded by people who specialize</p> <p>25 in risk assessment. We have a Center for Risk</p>



<p style="text-align: right;">Page 14</p> <p>1 Assessment at the School of Public Health. One of my 2 principal staff members teaches on risk assessment, so 3 I'm familiar with the issues that Mr. Pleus raised. 4 However, it is my belief that the risk 5 assessment was actually conducted by the EPA when it 6 established its MCL levels back in 1991, and it was 7 not my task to conduct, nor would I have the necessary 8 depth of experience and background to do it myself. 9 But having had the EPA risk assessment then, as a 10 public health person I can say these levels that 11 exceed MCL create the hazard for the following medical 12 conditions with which I am very familiar. 13 Q. Okay, and I have read some of your 14 materials. For example, you chaired the committee for 15 the FDA trying to establish a risk ranking model. 16 A. Yes. 17 Q. So I understand you do have some background 18 in that area. And so for the purposes of the Pleus 19 report, it is your belief that the EPA engaged in the 20 proper toxicological risk assessment when it 21 established the MCL for nitrate? 22 A. I do believe that, although I would say 23 that my work with FDA and EPA, the political process 24 that is involved in federal regulatory agencies makes 25 it very different from the academic risk assessment</p>	<p style="text-align: right;">Page 16</p> <p>1 EPA did a very credible job given the limitations. 2 You always look to have more resources, 3 more data points. The challenge for the EPA with 4 regard to establishing MCLs for nitrate is very 5 similar to the challenge that they had for beach 6 closures and public water supplies. That, again, was 7 derived from two sample sites and then extrapolated 8 for the whole country. The EPA, using its nitrate 9 risk assessment, had a few more sample sites, but 10 nonetheless -- 11 MR. TEBBUTT: Can I interrupt for just a 12 second? I know this is one of those ones where you 13 are going the tell me to shut up. I understand your 14 question to be the EPA report on Yakima Valley, not 15 the MCL; is that correct? 16 MR. MONAHAN: That is correct, but I was 17 fascinated by the answer, and would invite him to 18 finish. But you are right. I want to focus on the 19 EPA report for nitrates in the Yakima Valley. 20 A. It's easy to finish, because I was about 21 there. 22 Q. Okay. 23 A. And that is, it's sort of the last refuge 24 of the academic scoundrel to ask for more research, 25 and I guess all of us would say of the EPA that it has</p>
<p style="text-align: right;">Page 15</p> <p>1 that my colleagues attempted to carry out. 2 I believe that the issue with regard to 3 Mr. Pleus' concerns, first of all, I think he lays out 4 a very credible and consistent description of what 5 risk assessment is all about, and it's almost as 6 though he was just sort of got off at the wrong exit 7 before recognizing that I was going to be relying on a 8 previous body of work, which I believe is credible, 9 and until it is refuted by additional scientific 10 evidence it is the best we have to go on. 11 Q. Based on your background and history and 12 familiarity with risk assessment, have you -- have you 13 undertaken any effort to judge the EPA report on 14 nitrates that everyone has been citing to and relying 15 on in this case? 16 Do you think that that was -- what kind of 17 grade does that receive as an effort to assess risk? 18 MR. TEBBUTT: Objection, vague and 19 ambiguous. 20 A. Let me respond by saying that I read the 21 WHO report carefully, which arrived at a different 22 assessment based again on a different set of 23 circumstances, different countries. And looking at 24 the way in which the EPA arrived at its figures and 25 the way the WHO arrived at its figures, I think the</p>	<p style="text-align: right;">Page 17</p> <p>1 been chronically underfunded, that it has to develop 2 guidelines and standards based on what often is not an 3 optimal number of data points and sample sizes. 4 But given all those caveats, I believe that 5 the 1991 report is credible, is the law of the land 6 and we should abide by it until it is demonstrated by 7 more comprehensive scientific data to either confirm 8 it or perhaps raise questions about its validity. 9 Q. I'm unfamiliar with the WHO report that you 10 referenced. Can you tell me a little bit more about 11 that? 12 A. They simply arrived at an MCL of 50 rather 13 than 10, and they had even fewer data points, and it 14 was largely based on what we called descriptive 15 epidemiology, not specific analytic epidemiology where 16 you actually follow a population over a period of time 17 and document the exposure to a particular level of 18 toxin. 19 Q. And WHO is World Health Organization? 20 A. World Health Organization. 21 Q. Was that an international study? 22 A. Most of the data were from European 23 studies, but it speaks internationally. 24 Q. And what's the timing of that report, do 25 you recall? Is it in or around the time of the 1991</p>



<p style="text-align: right;">Page 18</p> <p>1 EPA regulation?</p> <p>2 A. It's a little more recent, but late '90s,</p> <p>3 perhaps.</p> <p>4 Q. Okay.</p> <p>5 We can spend some time with this in your</p> <p>6 report, if you like, but you do spend some time</p> <p>7 talking about the potential for MCLs of less than 10</p> <p>8 raising health concerns.</p> <p>9 A. Um-hmm.</p> <p>10 Q. And there are a number of reports and</p> <p>11 studies, as I see, back and forth on that. I want to</p> <p>12 make sure you are not offering an opinion today, are</p> <p>13 you, to a reasonable degree of medical certainty that</p> <p>14 MCLs of less than 10 are likely to cause a substantial</p> <p>15 or imminent public health concern?</p> <p>16 A. No.</p> <p>17 Q. Okay.</p> <p>18 A. I think it's important to recognize that</p> <p>19 there are credible examples of, raising question about</p> <p>20 whether MCL of 10 is too high rather than is it too</p> <p>21 low. And so I believe that that's the exact kind of</p> <p>22 information that we need more of.</p> <p>23 We need more research about exactly what</p> <p>24 the risk levels are for some of these lower levels</p> <p>25 which are deemed safe, but I think there is enough</p>	<p style="text-align: right;">Page 20</p> <p>1 around the three dairies in question, and what has</p> <p>2 been described as downstream from the dairies. I</p> <p>3 believe the most distant well was about a mile and a</p> <p>4 half away.</p> <p>5 Q. Okay.</p> <p>6 A. So they were residential wells scattered in</p> <p>7 that general area of the Yakima Valley. So we would</p> <p>8 consider that convenience sampling rather than a</p> <p>9 specific plot of randomized bore holes into the</p> <p>10 groundwater, and -- but the distribution looked to me</p> <p>11 to be a pretty adequate sample of what was going on in</p> <p>12 the groundwater.</p> <p>13 Q. But from a risk assessment standpoint, is</p> <p>14 that a reasonable approach, to target wells that are</p> <p>15 already in the vicinity of business operations that</p> <p>16 you suspect of contamination?</p> <p>17 A. If your purpose is to determine whether or</p> <p>18 not people drinking, who live in the area drinking</p> <p>19 from their wells, yes, it seems like a highly</p> <p>20 appropriate approach.</p> <p>21 Q. Highly appropriate to determine whether or</p> <p>22 not there are nitrates in the water of the people in</p> <p>23 that region.</p> <p>24 A. If they are at risk of exposure to elevated</p> <p>25 nitrates, yes.</p>
<p style="text-align: right;">Page 19</p> <p>1 concern that it should be explored, but I'm not</p> <p>2 prepared to say that today it's an imminent threat to</p> <p>3 the health of the people of Yakima Valley.</p> <p>4 Q. Okay, very good. Thank you.</p> <p>5 Okay, so let's go back and let's just talk</p> <p>6 about the EPA report that did find the nitrates in the</p> <p>7 residential wells in Lower Yakima Valley. You have</p> <p>8 had a chance to study that report?</p> <p>9 A. I have read it, yes.</p> <p>10 Q. And have you seen the 2013 amendments or</p> <p>11 updates to the report?</p> <p>12 A. I believe so.</p> <p>13 Q. I'm not suggesting to you that they are</p> <p>14 dynamic or that impressive or substantive.</p> <p>15 A. I've read a lot of stuff and I think -- but</p> <p>16 back in August I believe I did see the updates, yes.</p> <p>17 Q. Okay. Well, I want to talk about the</p> <p>18 report itself. As I understand it, there were 331</p> <p>19 wells originally tested?</p> <p>20 A. Yes.</p> <p>21 Q. That's consistent with your understanding?</p> <p>22 A. Yes.</p> <p>23 Q. What is your understanding about how those</p> <p>24 wells were identified or selected?</p> <p>25 A. They were selected geographically in and</p>	<p style="text-align: right;">Page 21</p> <p>1 Q. But in terms of trying to actually</p> <p>2 determine whether the dairies or the other sources,</p> <p>3 other operations are the sources of the nitrates, that</p> <p>4 wouldn't be a proper risk assessment approach, would</p> <p>5 it?</p> <p>6 A. I would defer to the hydrologist for that.</p> <p>7 Q. Okay.</p> <p>8 A. I don't know enough about the different</p> <p>9 soil characteristics of the Yakima Valley.</p> <p>10 Q. Okay. I guess the purpose of the question</p> <p>11 is, just from a statistical standpoint, and for the</p> <p>12 purpose of coming to a scientifically reasonable or</p> <p>13 reliable conclusion, wouldn't one want to have random</p> <p>14 sampling throughout the valley and not target an area</p> <p>15 where you know there are dairies and grow crops or</p> <p>16 other farming enterprises?</p> <p>17 A. From a public health perspective --</p> <p>18 MR. TEBBUTT: Objection, improper</p> <p>19 hypothetical, and doesn't state the facts of the</p> <p>20 report.</p> <p>21 A. From the public health perspective it would</p> <p>22 be nice to have a surveillance program that anybody on</p> <p>23 a private well in the state of Washington ought to</p> <p>24 periodically have the quality of their well water</p> <p>25 tested.</p>

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<p style="text-align: right;">Page 22</p> <p>1 Q. Are you aware or did you learn from reading</p> <p>2 any of the materials how many unregulated private</p> <p>3 wells there are in the Yakima Valley?</p> <p>4 A. No.</p> <p>5 Q. I think I saw a number of 24,000. Does</p> <p>6 that number ring any bells with you?</p> <p>7 A. No, but it sounds reasonable.</p> <p>8 Q. And out of that 24,000, there were some 331</p> <p>9 in the EPA report, right?</p> <p>10 A. Yes.</p> <p>11 Q. And out of those 331, 67 tested above the</p> <p>12 10 MCL threshold?</p> <p>13 A. Yes.</p> <p>14 Q. Which means, by my math, 264 wells tested</p> <p>15 below the MCL threshold, right?</p> <p>16 A. At or below. I think there were some that</p> <p>17 were right around 10.</p> <p>18 Q. But as we have already discussed, something</p> <p>19 below 10 you're not prepared to offer an opinion to a</p> <p>20 degree of reasonable scientific certainty that that</p> <p>21 presents an imminent substantial health threat, right?</p> <p>22 A. Yes.</p> <p>23 Q. And it's okay, if this is not an area of</p> <p>24 your expertise that's fine, but as I roll up my</p> <p>25 sleeves and try to make sense of all this information,</p>	<p style="text-align: right;">Page 24</p> <p>1 MR. TEBBUTT: Objection to the extent it</p> <p>2 mischaracterizes the EPA report.</p> <p>3 A. I would say that without really knowing,</p> <p>4 and I don't know soil characteristics, flow</p> <p>5 characteristics, that you could have a common source</p> <p>6 of a hazardous material and it could show up in</p> <p>7 different parts of the groundwater in different</p> <p>8 concentrations. So my own feeling as a belief as a</p> <p>9 public health person is that when you see</p> <p>10 contamination and you see it at a level that is</p> <p>11 injurious to the health of the people using and</p> <p>12 exposed to that contaminant, that's what you focus on.</p> <p>13 The details of how it got there and where</p> <p>14 it comes from and so forth require delving into that</p> <p>15 whole other area that I'm not an expert in.</p> <p>16 Q. Okay. Fair enough.</p> <p>17 MR. MONAHAN: Let's go off the record.</p> <p>18 (Recess taken -- 9:20 a.m.)</p> <p>19 (After recess -- 9:31 a.m.)</p> <p>20 MR. MONAHAN: Let's go back on the record.</p> <p>21 BY MR. MONAHAN:</p> <p>22 Q. Let's walk through your report a little</p> <p>23 bit.</p> <p>24 A. Okay.</p> <p>25 (Lawrence Deposition Exhibit No. 320 was</p>
<p style="text-align: right;">Page 23</p> <p>1 I want to pose questions to the first qualified public</p> <p>2 health expert that I have met in this case to see what</p> <p>3 your thoughts are.</p> <p>4 When we have 264 out of 331 wells testing</p> <p>5 below the minimum nitrate threshold, what does that</p> <p>6 tell us from a public health perspective?</p> <p>7 A. It tells us --</p> <p>8 MR. TEBBUTT: Objection, vague and</p> <p>9 ambiguous.</p> <p>10 A. It tells us that the consumers who rely on</p> <p>11 the 65 wells where it is above MCL are confronting a</p> <p>12 significant health hazard.</p> <p>13 Q. And how those numbers may play into any</p> <p>14 conclusions about causation, that's outside of your</p> <p>15 purview as I understand it, right?</p> <p>16 MR. TEBBUTT: Objection, vague and</p> <p>17 ambiguous.</p> <p>18 Q. Well, let me be more clear.</p> <p>19 When two out of three wells that are south</p> <p>20 and west of the dairies, in an area that the EPA has</p> <p>21 described as downgradient from a groundwater</p> <p>22 perspective, test at or below the MCL threshold for</p> <p>23 nitrates, do you believe that gives us any insights</p> <p>24 into causation and into why and how and from where</p> <p>25 those nitrates derived?</p>	<p style="text-align: right;">Page 25</p> <p>1 marked for identification.)</p> <p>2 BY MR. MONAHAN:</p> <p>3 Q. On the cover page I see the report has been</p> <p>4 prepared for Mr. Tebbutt, Center for Food Safety and</p> <p>5 an organization called Public Justice. To your</p> <p>6 knowledge, what role does Public Justice have in this</p> <p>7 case?</p> <p>8 A. I have related to Mr. Tebbutt and to the</p> <p>9 Center for Food Safety primarily, and I have to pause</p> <p>10 and ask whether Public Justice is the CARE.</p> <p>11 MR. TEBBUTT: I think we can clear this up</p> <p>12 by saying my office prepared the cover page.</p> <p>13 MR. MONAHAN: Well, counsel, we can have</p> <p>14 this on or off the record. Doesn't matter to me.</p> <p>15 What role does Public Justice have in this report or</p> <p>16 this case?</p> <p>17 MR. TEBBUTT: Jessica Culpepper is counsel</p> <p>18 for Public Justice in the case.</p> <p>19 MR. MONAHAN: Clears it up for me.</p> <p>20 THE WITNESS: And for me, does CARE work</p> <p>21 exclusively with you and not with --</p> <p>22 MR. TEBBUTT: Off the record.</p> <p>23 (Discussion off the record.)</p> <p>24 BY MR. MONAHAN:</p> <p>25 Q. Let's just start with Paragraph 1 of your</p>



<p style="text-align: right;">Page 26</p> <p>1 report, sir. You talk about, in the final sentence,</p> <p>2 how, where your opinions are focused, but indicate you</p> <p>3 also have opinions about other potential pathways. Do</p> <p>4 you see that?</p> <p>5 A. Yes.</p> <p>6 Q. You understand that this is a case about</p> <p>7 soil and groundwater, right?</p> <p>8 A. Yes.</p> <p>9 Q. And that any airborne or other contaminants</p> <p>10 or health risks are not something that we are arguing</p> <p>11 about in this case. Do you understand that?</p> <p>12 A. Yes.</p> <p>13 Q. So for the purposes of this case, you're</p> <p>14 not prepared to offer any opinions about how the</p> <p>15 operations of the Cow Palace may affect the air or</p> <p>16 other potential avenues of health risks other than</p> <p>17 water and soil, right?</p> <p>18 MR. TEBBUTT: Objection, vague and</p> <p>19 ambiguous. Misstates the expert report.</p> <p>20 A. Can you repeat that, please?</p> <p>21 Q. This is a RCRA case, and it's a case that</p> <p>22 involves allegations of disposal of solid wastes to</p> <p>23 soil and water, and my questions to you so far have</p> <p>24 been primarily focused on residential wells. I'm</p> <p>25 going to ask you if you have any opinions about the</p>	<p style="text-align: right;">Page 28</p> <p>1 dried manure. So the whole complexity of the</p> <p>2 operation, the focus is on the nitrate in the</p> <p>3 groundwater, yes.</p> <p>4 But from a public health perspective it has</p> <p>5 to be seen in the context of other risks to the people</p> <p>6 who are drinking the groundwater, being exposed to</p> <p>7 contaminants in the soil. But I'm not here to talk</p> <p>8 about the airborne problems, mainly to cite them as</p> <p>9 part of this broader picture of health risks.</p> <p>10 Q. I understand. So while the results of your</p> <p>11 colleagues' studies provides some context for you in</p> <p>12 which to assess the overall health risks presented to</p> <p>13 this community, you are not prepared to offer an</p> <p>14 opinion today to a degree of reasonable medical or</p> <p>15 scientific certainty that the operations of the Cow</p> <p>16 Palace are causing a substantial and imminent threat</p> <p>17 to public health by way of airborne pathogens or</p> <p>18 contaminants, correct?</p> <p>19 A. That's correct.</p> <p>20 Q. In Paragraph 2, just to be clear, you</p> <p>21 indicate that the residents of Lower Yakima Valley are</p> <p>22 exposed to significant risks to their health and</p> <p>23 well-being resulting from manure loading and nitrate</p> <p>24 contamination of groundwater used as the source of</p> <p>25 drinking water.</p>
<p style="text-align: right;">Page 27</p> <p>1 soil and whether any alleged contamination of soil</p> <p>2 constitutes a health risk. But when you say in your</p> <p>3 first paragraph that your opinions include health</p> <p>4 impacts and risks associated with exposure to nitrates</p> <p>5 and other compounds, hormones, pathogens, diseases,</p> <p>6 primarily through water but also through other</p> <p>7 potential pathways. I just want to make sure that I'm</p> <p>8 not missing something. So let me ask you, what did</p> <p>9 you mean by "other potential pathways"?</p> <p>10 A. As you saw from my report, later on I do</p> <p>11 refer to the fact that my center supported, and one of</p> <p>12 my staff members participated in a study, of airborne</p> <p>13 dust and the relationship between levels of</p> <p>14 contamination and households around the Yakima Valley</p> <p>15 and asthma and other respiratory disease. So when you</p> <p>16 talk about contamination of soil there are lots of</p> <p>17 pathways. One pathway is the contaminated soil, as</p> <p>18 water leaches through, down into the groundwater, it</p> <p>19 may carry some of those contaminants into the drinking</p> <p>20 water. But the other is that airborne pathways of the</p> <p>21 same contaminant in the case of the study done by</p> <p>22 Breyse and Williams, what they found in the, inside</p> <p>23 the homes as well as exterior where samples of dust</p> <p>24 that contained cell wall, bacterial cell wall</p> <p>25 endotoxin from bacteria that had been windborne from</p>	<p style="text-align: right;">Page 29</p> <p>1 I just want to be clear, when you use the</p> <p>2 term groundwater is that supposed to have any</p> <p>3 particular scientific or hydrological meaning?</p> <p>4 MR. TEBBUTT: Objection, vague and</p> <p>5 ambiguous.</p> <p>6 Q. Is that a term of art for you?</p> <p>7 A. Groundwater is a term that I use in, as a</p> <p>8 lay person in hydrology, to mean that if you have a</p> <p>9 shallow well and you're drawing your drinking water</p> <p>10 source from that, it's coming up from the groundwater.</p> <p>11 Q. Okay.</p> <p>12 A. I'm not distinguishing between various</p> <p>13 types of aquifers and so forth.</p> <p>14 Q. So whether the nitrates have contaminated</p> <p>15 one particular aquifer or a particular source of water</p> <p>16 beneath an individual well, you just don't know.</p> <p>17 A. I don't know.</p> <p>18 Q. You talk about in Paragraph 2, manure</p> <p>19 loading. What does that term mean?</p> <p>20 A. The term is meant to convey that with the</p> <p>21 problem of nitrate many, many cases have shown that it</p> <p>22 comes either from nonpoint source contamination of</p> <p>23 excess use of synthetic fertilizers or of</p> <p>24 concentrations of animal waste and manure.</p> <p>25 And given my background understanding of</p>



<p style="text-align: right;">Page 30</p> <p>1 the Yakima Valley and its operations, the size of the</p> <p>2 dairy herds, the constraints under which they operate,</p> <p>3 dispose of excess manure, I am drawing the conclusion</p> <p>4 that the nitrate present is most likely from that</p> <p>5 source rather than from excess application of</p> <p>6 synthetic fertilizer.</p> <p>7 Q. This is where I want to make sure that we</p> <p>8 are not tripping backward into a causation opinion.</p> <p>9 As an expert in public health, I understand that given</p> <p>10 the totality of circumstances surrounding these</p> <p>11 nitrate results in the residential well tests, that</p> <p>12 you are of the opinion and belief that it is related</p> <p>13 to the manure disposal operations on nearby dairy</p> <p>14 operations, correct?</p> <p>15 A. Yes.</p> <p>16 Q. But you are not prepared to offer an expert</p> <p>17 opinion that in fact the dairy operations are causing</p> <p>18 the elevated nitrate levels that were seen in the</p> <p>19 residential well tests and the surrounding area,</p> <p>20 correct?</p> <p>21 A. I'm saying it's more along the lines of if</p> <p>22 it flies like a duck and quacks like a duck, it must</p> <p>23 be a duck. If you have a very large concentration of</p> <p>24 animals, and with the Pew Commission I made site</p> <p>25 visits to large dairies, to feedlot operations, to</p>	<p style="text-align: right;">Page 32</p> <p>1 MR. TEBBUTT: I'm not suggesting anything.</p> <p>2 MR. MONAHAN: Well, you say that the AFC</p> <p>3 has found?</p> <p>4 MR. TEBBUTT: The well work that has been</p> <p>5 done under the AFC verifies the presence of high</p> <p>6 nitrates in the groundwater in that area.</p> <p>7 MR. MONAHAN: No question. No question.</p> <p>8 Okay. I thought you were suggesting that --</p> <p>9 MR. TEBBUTT: That's all. I'm not</p> <p>10 suggesting anything else.</p> <p>11 MR. MONAHAN: And again, I'm perhaps being</p> <p>12 too cautious here, and I don't mean to revisit the</p> <p>13 same ground over and over --</p> <p>14 BY MR. MONAHAN:</p> <p>15 Q. -- but in the end of Paragraph 2, or rather</p> <p>16 the end of Page 2, Paragraph 2, you state, "The</p> <p>17 defendants' contributions to groundwater</p> <p>18 contamination, as established by the EPA, the data</p> <p>19 generated by the dairies under the 2013 AOC and the</p> <p>20 plaintiffs' other experts," so three topics.</p> <p>21 You are not offering an opinion, are you,</p> <p>22 that the AOC, for example, establishes that Cow Palace</p> <p>23 contributed to the nitrate contamination, are you?</p> <p>24 MR. TEBBUTT: Objection, vague and</p> <p>25 ambiguous.</p>
<p style="text-align: right;">Page 31</p> <p>1 poultry and swine operations, and the very definition</p> <p>2 of a CAFO is that you end up with high concentrations</p> <p>3 of animal waste that needs to be disposed of in some</p> <p>4 way.</p> <p>5 So it's really if you find in a report from</p> <p>6 the EPA that there are high levels of nitrate in wells</p> <p>7 in an area that also has a large concentration of</p> <p>8 dairy operations, I'm making that as a general opinion</p> <p>9 about the likely source of the nitrate being manure</p> <p>10 loading.</p> <p>11 Q. Okay, but you do understand my distinction,</p> <p>12 correct?</p> <p>13 A. I do.</p> <p>14 Q. And you are not offering an opinion as to</p> <p>15 the actual cause of the nitrates, right?</p> <p>16 A. Correct.</p> <p>17 Q. I said nitrates, I mean the nitrates found</p> <p>18 by the EPA to be in the wells that the EPA has</p> <p>19 characterized as downgradient of the dairies, right?</p> <p>20 A. Correct.</p> <p>21 MR. TEBBUTT: And for the record, it's not</p> <p>22 just what the EPA has found but what the</p> <p>23 Administrative Order on Consent has also found.</p> <p>24 MR. MONAHAN: Let me make sure I understand</p> <p>25 what you're suggesting, counsel.</p>	<p style="text-align: right;">Page 33</p> <p>1 MR. MONAHAN: All right, I will start over.</p> <p>2 Q. Sir, you are not offering an expert opinion</p> <p>3 to a reasonable degree of scientific certainty, are</p> <p>4 you, that the data arising from the 2013</p> <p>5 Administrative Order on Consent establishes, again as</p> <p>6 a matter of reasonable scientific certainty, that the</p> <p>7 Cow Palace contributed nitrates to the wells that were</p> <p>8 being tested, right?</p> <p>9 A. You mean the manure loading from the Cow</p> <p>10 Palace?</p> <p>11 Q. Correct.</p> <p>12 A. They certainly didn't inject nitrate into</p> <p>13 the well water if that's what you're --</p> <p>14 Q. No. No. No.</p> <p>15 A. Well, as I understand the Administrative</p> <p>16 Order on Consent, it was a judgment, based on EPA's</p> <p>17 findings, that this relationship occurred and was,</p> <p>18 therefore, the responsibility of Cow Palace to help</p> <p>19 with remediation, with reverse osmosis, treatment at</p> <p>20 the household level and so on.</p> <p>21 Q. Absolutely true. The EPA made a judgment,</p> <p>22 and the parties entered an Administrative Order on</p> <p>23 Consent. No question about that.</p> <p>24 What I don't want to do, doctor, is show up</p> <p>25 at trial in February and have you tell the judge that</p>



<p style="text-align: right;">Page 34</p> <p>1 you have reviewed the AOC testing and that you've</p> <p>2 reviewed the EPA original nitrate report and you've</p> <p>3 reviewed the plaintiffs' other expert reports and</p> <p>4 therefore you are offering your expertise as a public</p> <p>5 health professional and expert to say that to a</p> <p>6 reasonable degree of scientific certainty Cow Palace</p> <p>7 contributed to the groundwater contamination.</p> <p>8 A. That was not my task. My task is to say is</p> <p>9 there nitrate above the MCL in the groundwater being</p> <p>10 used by shallow wells as the source of drinking water</p> <p>11 by families living in the Yakima Valley. And this</p> <p>12 context is a statement of why, in my opinion, the</p> <p>13 problem of nitrate, why I'm going to be talking about</p> <p>14 nitrate, not that I'm going to be the person tracing</p> <p>15 that causal pathway from Cow Palace to manure loading</p> <p>16 to nitrate filtering down into the groundwater,</p> <p>17 getting into the well and posing a health risk.</p> <p>18 I'm talking about, when there is nitrate at</p> <p>19 that level, it's a health risk to people consuming</p> <p>20 that water.</p> <p>21 Q. Perfect. Thank you.</p> <p>22 All right Center for a Liveable Future.</p> <p>23 A. Yes.</p> <p>24 Q. Tell me about that. What is that</p> <p>25 organization and how does it operate?</p>	<p style="text-align: right;">Page 36</p> <p>1 Q. Is CLF involved at any level in this case?</p> <p>2 A. No. Only through my participation as an</p> <p>3 expert witness.</p> <p>4 Q. But you're not wearing your CLF hat for</p> <p>5 this.</p> <p>6 A. No.</p> <p>7 Q. You indicate at Paragraph 7A that CLF has</p> <p>8 supervised, conducted and funded a wide range of</p> <p>9 research. And I want to see if I can narrow down some</p> <p>10 of the particular projects that CLF has worked on and</p> <p>11 have you identify for me where I might find some of</p> <p>12 these studies or research projects.</p> <p>13 Starting on Page 5, the first full sentence</p> <p>14 where it says "CLF conducts, supervises and funds</p> <p>15 research on such topics as," and then we go down three</p> <p>16 lines, "organic wastes such as ammonia and other</p> <p>17 nitrogen compounds."</p> <p>18 Do you see that?</p> <p>19 A. Yes.</p> <p>20 Q. And then the next line down, "The adverse</p> <p>21 effects of excess nutrients such as nitrogen and</p> <p>22 phosphorus from wastes produced by animals raised in</p> <p>23 confinement operations."</p> <p>24 I have looked for those studies. Can you</p> <p>25 tell me what studies those are and where I might find</p>
<p style="text-align: right;">Page 35</p> <p>1 A. The Center for a Liveable Future is an</p> <p>2 academic center within the university. It's housed in</p> <p>3 the Department of Environmental Health Sciences. I</p> <p>4 established it in 1996 to explore the connections, the</p> <p>5 interrelationships between the way in which we have</p> <p>6 shifted our food production toward more and more of an</p> <p>7 industrialized model and the way that the impact of</p> <p>8 that industrialization of the food supply has impacted</p> <p>9 the environment, on the one hand, and the quality of</p> <p>10 the diet on the other hand. And both of those changes</p> <p>11 then influence public health.</p> <p>12 So it includes people who are working on</p> <p>13 everything from issues on the supply side of the food</p> <p>14 system to the demand side. And we support people who</p> <p>15 are bench scientists working on antibiotic resistant</p> <p>16 organisms, to social scientists who are out in the</p> <p>17 community trying to figure out how to encourage people</p> <p>18 to make wiser purchases at the grocery store.</p> <p>19 Q. How is CLF funded?</p> <p>20 A. It's funded predominantly through a series</p> <p>21 of private foundations. We do have some federal grant</p> <p>22 money. We've had USDA grants, we've had EPA grants,</p> <p>23 and I don't believe -- we currently do not have any</p> <p>24 state funding, but we have had some state funding in</p> <p>25 the past.</p>	<p style="text-align: right;">Page 37</p> <p>1 them?</p> <p>2 A. We have -- now, one of our current staff</p> <p>3 members, Jillian Fry, did her Ph.D. thesis on the</p> <p>4 development of advocacy coalitions on the Eastern</p> <p>5 Shore of Maryland with regard to the poultry industry</p> <p>6 and excess phosphorus and nitrogen loading of surface</p> <p>7 waters leading to eutrophication of streams into the</p> <p>8 Chesapeake Bay. Her thesis is still in the gray</p> <p>9 literature. We are urging her to contribute to the</p> <p>10 peer-reviewed literature. She is working on papers</p> <p>11 related to that.</p> <p>12 Q. Okay.</p> <p>13 A. We have had -- I'm trying to think of</p> <p>14 other, but that particular phrase has been mostly</p> <p>15 related to impact on the environment rather than</p> <p>16 directly on public health.</p> <p>17 Q. Okay.</p> <p>18 A. We have had -- there is a paper by Sapkota,</p> <p>19 et al. that dealt with some of the problems related to</p> <p>20 excess nitrogen and environmental contamination.</p> <p>21 She's an associate professor at the University of</p> <p>22 Maryland School of Public Health and was a fellow with</p> <p>23 us early in her career.</p> <p>24 Q. Do you know where that paper was published?</p> <p>25 A. No, but I can get the information for you.</p>



<p style="text-align: right;">Page 38</p> <p>1 Q. The final part of that sentence references</p> <p>2 the impact of industrial dairy production on air and</p> <p>3 water quality. I'm familiar with the air quality</p> <p>4 study.</p> <p>5 Is there -- are you aware of a CLF study or</p> <p>6 report or any type of publication regarding impact of</p> <p>7 industrial dairy production on water quality?</p> <p>8 A. I believe that was part of the Pew</p> <p>9 Commission report.</p> <p>10 Q. Other than the Pew Commission report and</p> <p>11 was it Sapkota?</p> <p>12 A. Sapkota, S-a-p-k-o-t-a.</p> <p>13 Q. And the Sapkota paper, are you aware of any</p> <p>14 other published reports that I might be able to</p> <p>15 review --</p> <p>16 A. No.</p> <p>17 Q. Let me finish the question.</p> <p>18 -- that relate to the adverse effects of</p> <p>19 excess nutrients such as nitrogen or phosphorus or the</p> <p>20 impact of industrial dairy production on the water</p> <p>21 quality.</p> <p>22 A. No.</p> <p>23 Q. So let's talk about the Pew Charitable</p> <p>24 Trust project. You indicate that you served first as</p> <p>25 the assistant principle investigator and later the</p>	<p style="text-align: right;">Page 40</p> <p>1 Once we had the executive director and the</p> <p>2 commissioners on board, then we laid out about a</p> <p>3 two-year timetable of a dozen or so meetings of the</p> <p>4 commission, usually in association with the site</p> <p>5 visit. And we went from North Carolina to Arkansas to</p> <p>6 California to Colorado to Minnesota and gathered</p> <p>7 information about industrial food animal production.</p> <p>8 The commission was chaired by John Carlin,</p> <p>9 former governor of Kansas, and it had a range of</p> <p>10 people who were both involved on the policy and</p> <p>11 political side of agriculture as well as various</p> <p>12 people from academia. Professor of philosophy at</p> <p>13 Colorado State, for example, who has written widely on</p> <p>14 animal welfare issues; an infectious disease expert</p> <p>15 from the Harvard School of Public Health; nutritionist</p> <p>16 Marion Nestle from NYU. So it was a very diverse</p> <p>17 group.</p> <p>18 And the terms under which the commissioners</p> <p>19 agreed to serve was that we would reach decisions by</p> <p>20 consensus. So in the final analysis, the report was</p> <p>21 issued in April or May of 2008, and with about 20 plus</p> <p>22 major recommendations.</p> <p>23 And there were a few things that some</p> <p>24 commissioners wanted that others didn't feel that they</p> <p>25 could provide consensus. So it's -- it was an</p>
<p style="text-align: right;">Page 39</p> <p>1 principle investigator on the project?</p> <p>2 A. Yes.</p> <p>3 Q. And how would you describe the scope of the</p> <p>4 project and how you became involved in it?</p> <p>5 A. The environment program of The Pew</p> <p>6 Charitable Trust had actually initially approached</p> <p>7 Iowa State University College of Agronomy to organize</p> <p>8 the commission and to oversee it. And the dean of</p> <p>9 that college decided, after hearing from some of the</p> <p>10 large industrial agricultural interests in Iowa, that</p> <p>11 it probably would not be a good idea for them to</p> <p>12 proceed, that they should withdraw.</p> <p>13 Whereupon, the program officer of the</p> <p>14 environment program at The Pew Charitable Trust called</p> <p>15 Johns Hopkins and asked whether we would be willing to</p> <p>16 take this on despite the fact that we are not an</p> <p>17 agricultural college or not a land grant university,</p> <p>18 but because of the work of the Center for a Liveable</p> <p>19 Future had a familiarity with these issues.</p> <p>20 The charge to me and my co-PI, initially,</p> <p>21 and then ultimately just to me was to recruit and hire</p> <p>22 the executive director of the commission and then in</p> <p>23 collaboration with The Pew Charitable Trust to</p> <p>24 identify commissioners. And we spent about six months</p> <p>25 doing that.</p>	<p style="text-align: right;">Page 41</p> <p>1 accurate, I think, and very comprehensive assessment</p> <p>2 of fairly expert opinion by senior people on issues in</p> <p>3 public health, environment, animal welfare, and the</p> <p>4 impact on rural communities of the change in</p> <p>5 agriculture.</p> <p>6 Q. What role, if any, did you have in drafting</p> <p>7 the report?</p> <p>8 A. I was involved in a lot of editing, but the</p> <p>9 primary drafting responsibility was a scientific</p> <p>10 writer hired by the commission.</p> <p>11 Q. At the end of the project did you agree</p> <p>12 with the conclusions and recommendations --</p> <p>13 A. Yes.</p> <p>14 Q. -- included -- okay.</p> <p>15 MR. TEBBUTT: Off the record.</p> <p>16 (Discussion off the record.)</p> <p>17 BY MR. MONAHAN:</p> <p>18 Q. Let's move to Paragraph 10. And again, I</p> <p>19 know I'm sort of beating a dead horse here, but the</p> <p>20 way this is phrased in your written opinion is that</p> <p>21 you are saying that "It is clear that the defendant's</p> <p>22 manure management practices not only cause, but are</p> <p>23 and have been causing an imminent and substantial</p> <p>24 endangerment."</p> <p>25 As I understand it, doctor, you are not</p>



<p style="text-align: right;">Page 42</p> <p>1 going so far as to offer an opinion on cause, you are</p> <p>2 deferring in this case to the EPA report and other</p> <p>3 experts to determine whether or not Cow Palace's</p> <p>4 operations are the cause of the nitrate levels that</p> <p>5 cause you great concern, right?</p> <p>6 A. Can you restate? I know this is a very</p> <p>7 important part, so I want to be sure that I'm</p> <p>8 addressing specifically what you are asking about.</p> <p>9 Q. Okay.</p> <p>10 As I read Paragraph 10 where you indicate</p> <p>11 that it is your opinion that "It is clear that the</p> <p>12 defendant," meaning Cow Palace, "defendant's manure</p> <p>13 management practices not only cause, but are and have</p> <p>14 been causing an imminent and substantial endangerment</p> <p>15 to human health or the environment, and to protect</p> <p>16 public health actions must be immediately implemented</p> <p>17 to curb the amount of contaminants reaching</p> <p>18 groundwater and remediate the contamination caused by</p> <p>19 defendant's practices."</p> <p>20 That is what is on Page 8, Paragraph 10 of</p> <p>21 your report. That to me in written form is a much</p> <p>22 broader and more expansive articulation of your</p> <p>23 opinion from the one that you have offered here today.</p> <p>24 And, again, just so I'm prepared when you</p> <p>25 and I have this conversation again at trial, I want to</p>	<p style="text-align: right;">Page 44</p> <p>1 MR. MONAHAN: Do you want to --</p> <p>2 MR. TEBBUTT: No, there is no question</p> <p>3 pending right now. No. Wait for a question.</p> <p>4 THE WITNESS: I was going to say something</p> <p>5 while we were off the record but we are now back on</p> <p>6 the record so I won't.</p> <p>7 MR. MONAHAN: Let's go off.</p> <p>8 (Discussion off the record.)</p> <p>9 MR. MONAHAN: Back on the record.</p> <p>10 BY MR. MONAHAN:</p> <p>11 Q. Doctor, have you read the expert reports</p> <p>12 offered by the hydrologist and geologist retained by</p> <p>13 Cow Palace?</p> <p>14 A. Yes.</p> <p>15 Q. So you've read the Stewart Melvin report,</p> <p>16 James Maul, Mr. Steven's. Have you read those</p> <p>17 reports?</p> <p>18 A. Mr. Steven's? The first two I recognize.</p> <p>19 I'm not sure.</p> <p>20 Q. There is also a Mr. Trainor, Mr. Backe.</p> <p>21 Have you read those reports?</p> <p>22 A. Yes.</p> <p>23 Q. So you understand there is a robust debate</p> <p>24 among the experts as to whether or not the EPA report</p> <p>25 itself is reliable, correct?</p>
<p style="text-align: right;">Page 43</p> <p>1 make sure where we are drawing the lines on your</p> <p>2 opinion. Okay?</p> <p>3 A. Yes.</p> <p>4 Q. So as I understand it, whether or not the</p> <p>5 defendant's manure management practices are the cause</p> <p>6 of the nitrates that cause you concern from a public</p> <p>7 health perspective is an issue that you defer to EPA</p> <p>8 and other experts, right?</p> <p>9 A. I defer to their having connected the dots,</p> <p>10 but my opinion is that their methods were sound, that</p> <p>11 the whole overall picture makes it my judgment, my</p> <p>12 opinion, that the problem starts with Cow Palace with</p> <p>13 manure management, goes through all the processes that</p> <p>14 the hydrologist opined about, that the EPA testing</p> <p>15 provided data about. And that when I look at that</p> <p>16 from a public health professional perspective, I</p> <p>17 accept those as valid and scientifically sound</p> <p>18 arguments. So the sum total is this is the problem</p> <p>19 and this is what needs to happen in order to alleviate</p> <p>20 the public health threat.</p> <p>21 MR. MONAHAN: Let's go off the record.</p> <p>22 (Discussion off the record.)</p> <p>23 MR. MONAHAN: Back on the record.</p> <p>24 BY MR. MONAHAN:</p> <p>25 Q. Okay, I will be asking some questions --</p>	<p style="text-align: right;">Page 45</p> <p>1 MR. TEBBUTT: Objection to the</p> <p>2 characterization, robust.</p> <p>3 A. Repeat that last part of the question,</p> <p>4 please.</p> <p>5 Q. Yes. You understand that there is a, I</p> <p>6 will call it a spirited debate among the experts in</p> <p>7 this case as to whether or not the conclusions reached</p> <p>8 by the EPA are scientifically valid or reliable.</p> <p>9 A. Yes.</p> <p>10 Q. Are you offering an opinion, sir, are you</p> <p>11 volunteering to join that debate, are you offering an</p> <p>12 opinion that the EPA report is, in fact, a reasonable,</p> <p>13 and includes reasonable and valid conclusions about</p> <p>14 the cause of the nitrates that you were asked to</p> <p>15 assess from a public health perspective?</p> <p>16 A. Yes.</p> <p>17 Q. All right. And so tell me then why, to a</p> <p>18 reasonable degree of medical or scientific certainty,</p> <p>19 you believe the EPA report constitutes valid, reliable</p> <p>20 science.</p> <p>21 A. It strikes me as having been conducted with</p> <p>22 appropriate sampling frame. They have well water</p> <p>23 samples and upgradient, downgradient.</p> <p>24 It all points in the direction of a</p> <p>25 plausible and scientifically valid interpretation of</p>



<p style="text-align: right;">Page 46</p> <p>1 why you would have less contamination upgradient of a</p> <p>2 presumptive source and greater contamination</p> <p>3 downgradient.</p> <p>4 I guess there is also my general belief as</p> <p>5 a sometime critic of our federal regulatory process,</p> <p>6 that I also have a good deal of confidence in the</p> <p>7 professionalism of the people who are doing the actual</p> <p>8 field work for agencies like the EPA and the FDA.</p> <p>9 Q. Anything else you would like to offer as to</p> <p>10 why you believe the EPA report and its conclusions</p> <p>11 regarding causation of the nitrates found in the tests</p> <p>12 constitutes valid, reliable science?</p> <p>13 A. No. I think my summary captures how I</p> <p>14 interpret that report.</p> <p>15 Q. Okay.</p> <p>16 You are not a hydrologist, are you?</p> <p>17 A. No.</p> <p>18 Q. So whether or not there are -- let me</p> <p>19 rephrase that.</p> <p>20 You haven't done any research into the</p> <p>21 hydraulic dynamics of the Yakima Valley?</p> <p>22 A. No.</p> <p>23 Q. Have you ever been to the Yakima Valley?</p> <p>24 A. No.</p> <p>25 Q. So you have never been to Cow Palace in</p>	<p style="text-align: right;">Page 48</p> <p>1 then saw a spray gun outside her window; is that</p> <p>2 right?</p> <p>3 A. Yes.</p> <p>4 Q. Do you recall when that was?</p> <p>5 A. I don't. It would have had to have been</p> <p>6 prior to 2007.</p> <p>7 Q. And the Pew Commission report indicates</p> <p>8 that there was subsequent elevated nitrate levels in</p> <p>9 her drinking well, right?</p> <p>10 A. Yes.</p> <p>11 Q. And that's what she told the Pew Commission</p> <p>12 prior to 2007?</p> <p>13 A. I would have to check that, but I think</p> <p>14 that sounds reasonable.</p> <p>15 Q. I'm going to go back and double-check that</p> <p>16 one and we will cross that off my list before we leave</p> <p>17 today.</p> <p>18 So you're not in any position to tell the</p> <p>19 court which hydrologists are right or wrong about the</p> <p>20 manner in which groundwater may move throughout the</p> <p>21 Yakima Valley, right?</p> <p>22 A. Correct.</p> <p>23 Q. And you're not in any position to tell the</p> <p>24 judge which expert might be right or wrong about how</p> <p>25 nitrates may move through the soil in the Yakima</p>
<p style="text-align: right;">Page 47</p> <p>1 particular?</p> <p>2 A. No.</p> <p>3 Q. Have you ever spoken to any of the members</p> <p>4 of Community Association for Restoration of the</p> <p>5 Environment?</p> <p>6 A. Yes.</p> <p>7 Q. Who?</p> <p>8 A. Helen Reddout.</p> <p>9 Q. Is that in the context of this case?</p> <p>10 A. No.</p> <p>11 Q. You know her before this case?</p> <p>12 A. Yes.</p> <p>13 Q. In what context?</p> <p>14 A. She was interviewed by the Pew Commission.</p> <p>15 Q. That's right, I remember seeing her quote</p> <p>16 in the report. So that was a telephone conversation?</p> <p>17 A. You know, I can't recall. I think, no. I</p> <p>18 think she actually attended a commission meeting, when</p> <p>19 the commission met on the west coast, not in</p> <p>20 Washington.</p> <p>21 Q. I see. So she traveled to meet with you?</p> <p>22 A. Yes.</p> <p>23 Q. As I recall her quote, and I can get it for</p> <p>24 you if you like. She had observed -- her quote was</p> <p>25 that she smelled manure oozing through her window and</p>	<p style="text-align: right;">Page 49</p> <p>1 Valley, right?</p> <p>2 A. Correct.</p> <p>3 Q. And whether or not there is any hydraulic</p> <p>4 connectivity between the Cow Palace lagoons and any of</p> <p>5 the wells that have been tested in this case, you're</p> <p>6 not in any position to offer an opinion, are you?</p> <p>7 A. Restate.</p> <p>8 Q. Yes. Whether or not there is any hydraulic</p> <p>9 connectivity between the Cow Palace lagoons and any of</p> <p>10 the well water that was tested in this case, you just</p> <p>11 don't know, do you?</p> <p>12 A. I don't.</p> <p>13 Q. You would have to defer to the experts on</p> <p>14 that one?</p> <p>15 A. Yes.</p> <p>16 Q. How many upgradient wells were tested by</p> <p>17 the EPA?</p> <p>18 A. Of that 260 odd, the best I recall half a</p> <p>19 dozen or so.</p> <p>20 Q. Is that a guess?</p> <p>21 A. Yes.</p> <p>22 MR. TEBBUTT: One important thing, if</p> <p>23 you're going to guess, say you're going to guess.</p> <p>24 Otherwise, don't guess.</p> <p>25 A. I'm estimating, but I don't recall</p>



<p style="text-align: right;">Page 50</p> <p>1 precisely.</p> <p>2 Q. Out of 24,000 unregulated wells in the</p> <p>3 Yakima Valley, is 331 a statistically valid sampling?</p> <p>4 MR. TEBBUTT: Objection incomplete</p> <p>5 hypothetical. Vague and ambiguous.</p> <p>6 A. Repeat, please.</p> <p>7 Q. Well, do you have any expertise or formal</p> <p>8 training in statistics?</p> <p>9 A. I do.</p> <p>10 Q. And in your background and history in</p> <p>11 assessing risk, if one is to reach any valid</p> <p>12 statistical inferences from information, one must be</p> <p>13 operating from a statistically valid sample size,</p> <p>14 right?</p> <p>15 A. Yes.</p> <p>16 Q. Is the EPA selection of 331 out of 24,000</p> <p>17 unregulated wells in the Yakima Valley a statistically</p> <p>18 significant sample size?</p> <p>19 MR. TEBBUTT: Objection, incomplete</p> <p>20 hypothetical. Vague and ambiguous.</p> <p>21 A. Sampling is an overall term for obtaining</p> <p>22 an adequate statistical sample. Stratified random</p> <p>23 sampling focuses on different aspects, and if you are</p> <p>24 specifically looking for the prevalence of pregnancy</p> <p>25 in the human population, you wouldn't bother testing</p>	<p style="text-align: right;">Page 52</p> <p>1 speculation.</p> <p>2 A. As I stated earlier, sources of nitrate</p> <p>3 contamination come from application of synthetic</p> <p>4 fertilizers in amounts that exceed the uptake of the</p> <p>5 crop, leaky latrines, and concentrated manure, whether</p> <p>6 manure open cesspits or spray fields or application of</p> <p>7 dried manure.</p> <p>8 So I think the issue here is really that</p> <p>9 the EPA would use reasonable approaches to say where</p> <p>10 are we likely to see excess amounts of nitrogen,</p> <p>11 without necessarily restricting that to dairy</p> <p>12 operations. But certainly dairy operations in the</p> <p>13 Lower Yakima Valley are a major part of nitrogen</p> <p>14 loading.</p> <p>15 Q. So you read the final report from the</p> <p>16 Yakima County Public Services on its nitrate treatment</p> <p>17 pilot program, didn't you?</p> <p>18 A. Yes.</p> <p>19 Q. That's not listed in your report as</p> <p>20 something that you had read.</p> <p>21 A. Yes.</p> <p>22 Q. And that included a number of positive</p> <p>23 nitrate test results. When I say positive I mean they</p> <p>24 exceeded the 10 MCL threshold, right?</p> <p>25 A. Yes.</p>
<p style="text-align: right;">Page 51</p> <p>1 the male population. You would stratify by gender.</p> <p>2 So if you're looking for potential nitrate exceedances</p> <p>3 of the MCL you would go to that part of the valley</p> <p>4 where you have other reasons to be concerned about</p> <p>5 excess loading of nitrogen in the soil. So without</p> <p>6 knowing the details of how the EPA chose to use those</p> <p>7 260 wells, it appears to me that it was an appropriate</p> <p>8 statistical stratification and sampling in an area of</p> <p>9 concern.</p> <p>10 So to use the 22,000 as the denominator</p> <p>11 here would probably not be appropriate.</p> <p>12 Q. To use your example in stratified random</p> <p>13 sampling, you can exclude men from the pregnancy rate,</p> <p>14 because they are biologically incapable of becoming</p> <p>15 pregnant, right?</p> <p>16 A. Right.</p> <p>17 Q. But you're not suggesting that it's</p> <p>18 impossible to have an elevated nitrate level unless</p> <p>19 you are near a dairy, are you?</p> <p>20 A. No.</p> <p>21 Q. In fact, you would agree there are hundreds</p> <p>22 if not thousands of wells in the Yakima Valley that</p> <p>23 have elevated nitrate levels that have nothing to do</p> <p>24 with dairies, right?</p> <p>25 MR. TEBBUTT: Objection, calls for</p>	<p style="text-align: right;">Page 53</p> <p>1 Q. Did you make any assessment of that report</p> <p>2 in terms of whether or not those positive results were</p> <p>3 located by or near dairies?</p> <p>4 A. No.</p> <p>5 Q. Do you remember that there were dozens of</p> <p>6 nitrate test results in excess of 10, some in excess</p> <p>7 of 50, that were nowhere near dairies?</p> <p>8 A. Yes.</p> <p>9 MR. TEBBUTT: Objection to the extent it</p> <p>10 mischaracterizes the record --</p> <p>11 Q. You do recall. Okay. So you agree that</p> <p>12 it's entirely not possible but in fact a fact that</p> <p>13 there are elevated levels of nitrates throughout the</p> <p>14 Yakima Valley that have no relation to dairies, right?</p> <p>15 MR. TEBBUTT: Objection, calls for</p> <p>16 speculation.</p> <p>17 A. As I said, if you have a shallow well and</p> <p>18 an aging pit privy on your own property you can be</p> <p>19 your own source of contamination.</p> <p>20 Q. Correct, and if someone is trying to</p> <p>21 ascertain cause, we are going to want to look at</p> <p>22 whether or not you've got a septic tank in a drain</p> <p>23 field, right?</p> <p>24 A. Yes.</p> <p>25 MR. TEBBUTT: Objection, incomplete</p>



<p style="text-align: right;">Page 54</p> <p>1 hypothetical.</p> <p>2 Q. We are going to want to look at whether or</p> <p>3 not there are other agricultural operations nearby</p> <p>4 that may be using manure or other nitrogen based</p> <p>5 additives, right?</p> <p>6 A. I have not been to the Yakima Valley. My</p> <p>7 understanding, however, is that the wells at issue</p> <p>8 here are located within an area that is either</p> <p>9 occupied by the dairy or land owned by the dairy where</p> <p>10 fodder, corn, grass is grown and manure application,</p> <p>11 either in liquid form or dried manure, is applied.</p> <p>12 I also known because Helen Reddout is an</p> <p>13 orchardist that there are cherry orchards and you just</p> <p>14 gave an example of a pear orchard, so yes, there are</p> <p>15 other agricultural operations. The question is how</p> <p>16 are they distributed around the site of these wells.</p> <p>17 Q. Okay. How are they distributed around the</p> <p>18 site of these wells?</p> <p>19 A. The wells are, the downgradient wells, some</p> <p>20 of the distant ones are beyond the confines of the</p> <p>21 land owned by the dairies, but the majority of them</p> <p>22 are actually in the area of the three dairies.</p> <p>23 Q. Well, you're not in any position to offer</p> <p>24 an opinion, are you, as to whether or not the wells</p> <p>25 that were tested in this case are, as a matter of</p>	<p style="text-align: right;">Page 56</p> <p>1 to determine whether in fact there was a hydrological</p> <p>2 connection between the lagoons or the dairy operations</p> <p>3 and the wells located to the south and west, one would</p> <p>4 have to do more research, right?</p> <p>5 MR. TEBBUTT: Objection to the extent it</p> <p>6 mischaracterizes the records.</p> <p>7 A. I guess my best response would be that I</p> <p>8 would defer to the hydrologists on that.</p> <p>9 Q. Okay. And, again, I apologize if I'm</p> <p>10 pushing back too hard on this. To simply say that you</p> <p>11 defer to the EPA and the hydrologists is one thing,</p> <p>12 but to say that you are blessing their reports and</p> <p>13 finding them to be valid and choosing them as more</p> <p>14 reliable or credible than the defendants' reports,</p> <p>15 that's where I need to examine the basis of your</p> <p>16 opinion.</p> <p>17 A. Um-hmm.</p> <p>18 Q. Okay?</p> <p>19 A. Yes.</p> <p>20 Q. So you're not offering an independent</p> <p>21 opinion as to which hydrologist makes a more</p> <p>22 persuasive case, are you?</p> <p>23 A. If I had three hydrologists to choose</p> <p>24 among, an EPA hydrologist, a hydrologist for the</p> <p>25 plaintiff, and a hydrologist for the defendant, it has</p>
<p style="text-align: right;">Page 55</p> <p>1 fact, downgradient from the groundwater movement</p> <p>2 perspective, are you?</p> <p>3 A. The term downgradient is the term that the</p> <p>4 hydrologists are using, so I'm relying on their</p> <p>5 judgment about that.</p> <p>6 Q. You understand that even the EPA said</p> <p>7 whether it is downgradient or not would require an</p> <p>8 analysis of things like topography, pumpage, drains,</p> <p>9 ditches, any number of other hydraulic dynamics,</p> <p>10 right?</p> <p>11 MR. TEBBUTT: Objection, vague and</p> <p>12 ambiguous.</p> <p>13 A. What is the question?</p> <p>14 Q. The question is, when you use the term</p> <p>15 downgradient, I understand what the term means. But I</p> <p>16 want to make sure you're not offering an opinion as to</p> <p>17 whether or not the actual wells tested in the case</p> <p>18 were, in fact, downgradient, because as you</p> <p>19 understand, or you do understand, that that's a matter</p> <p>20 of debate between the experts, right?</p> <p>21 A. It's a matter of debate, but the EPA stated</p> <p>22 that the general movement of water is from the</p> <p>23 northeast to the southwest.</p> <p>24 Q. Okay.</p> <p>25 But the EPA also recognized that in order</p>	<p style="text-align: right;">Page 57</p> <p>1 been my experience that I would probably get a more</p> <p>2 objective assessment from the EPA hydrologist.</p> <p>3 Q. That is your bias.</p> <p>4 A. That's my bias.</p> <p>5 Q. Okay. But in terms of you making an</p> <p>6 objective assessment of the credibility of their</p> <p>7 respective reports, you're just not qualified to offer</p> <p>8 that, are you?</p> <p>9 A. I'm not qualified.</p> <p>10 Q. Are you aware of, from the 67 wells out of</p> <p>11 331 that tested above the 10 parts per million</p> <p>12 threshold for nitrates, are you aware where any of</p> <p>13 those wells were located in relation to septic tanks</p> <p>14 or drainage fields?</p> <p>15 A. No.</p> <p>16 Q. Are you aware of how deep the wells were?</p> <p>17 A. No.</p> <p>18 Q. Are you aware of how the wells were</p> <p>19 constructed?</p> <p>20 A. No.</p> <p>21 Q. Are you aware of when the wells were</p> <p>22 constructed?</p> <p>23 A. No.</p> <p>24 Q. Are you aware of whether there was anything</p> <p>25 in the construction or screening capacities of the</p>



<p style="text-align: right;">Page 58</p> <p>1 wells that might protect those wells from any local</p> <p>2 contamination?</p> <p>3 A. By local, what do you mean by local?</p> <p>4 Q. Let me be more specific.</p> <p>5 Do you know whether any of the well</p> <p>6 dynamics were such that they could actually provide a</p> <p>7 conduit for contaminants to reach the source water?</p> <p>8 MR. TEBBUTT: Objection, calls for</p> <p>9 speculation.</p> <p>10 A. I don't -- I don't follow that.</p> <p>11 Q. Okay. You don't know anything about the</p> <p>12 particular dynamics of any of these wells, correct?</p> <p>13 A. Just that they are shallow wells drawing</p> <p>14 from groundwater. That's --</p> <p>15 Q. What is your definition of shallow?</p> <p>16 A. Fifty to 200 feet.</p> <p>17 Q. And so whether they draw from the salt</p> <p>18 aquifer or the alluvial aquifer, you don't know?</p> <p>19 A. No.</p> <p>20 Q. Whether they are even drawing from the same</p> <p>21 aquifer, you don't know.</p> <p>22 A. No.</p> <p>23 Q. Whether that aquifer has any hydrological</p> <p>24 connectivity to the water -- well, to the Cow Palace</p> <p>25 wastewater lagoons, you don't know.</p>	<p style="text-align: right;">Page 60</p> <p>1 Q. And what is your, for the purposes of you</p> <p>2 blessing the EPA report, what is your recollection of</p> <p>3 those upgradient tests?</p> <p>4 A. That the nitrate levels were lower than the</p> <p>5 ones that were described as downgradient.</p> <p>6 Q. Now, the ones that were described as</p> <p>7 downgradient, you understand for the EPA report those</p> <p>8 were taken from a series of wells that had already</p> <p>9 tested for high nitrates, right?</p> <p>10 A. Yes.</p> <p>11 Q. And that out of the 67 wells that tested</p> <p>12 for high nitrates the EPA actually selected the 25</p> <p>13 highest testing wells, correct?</p> <p>14 MR. TEBBUTT: Objection to the extent it</p> <p>15 mischaracterizes the record.</p> <p>16 A. I'm not sure I follow the question.</p> <p>17 Q. Well, let me make sure you and I understand</p> <p>18 the EPA report the same way.</p> <p>19 Out of the 331 wells that were selected for</p> <p>20 testing in the first place --</p> <p>21 A. Yes.</p> <p>22 Q. -- some 67 tested for elevated nitrate</p> <p>23 levels?</p> <p>24 A. Yes.</p> <p>25 Q. And out of those 67 the EPA selected 25 for</p>
<p style="text-align: right;">Page 59</p> <p>1 A. No.</p> <p>2 Q. I want to get back to your concept of</p> <p>3 stratified random sampling and just explore that a</p> <p>4 little bit more.</p> <p>5 What type of farm operations are upgradient</p> <p>6 from Cow Palace?</p> <p>7 A. I don't know.</p> <p>8 Q. Do you know anything about the acreage and</p> <p>9 soil or water that is upgradient of Cow Palace?</p> <p>10 A. No.</p> <p>11 Q. In the EPA report, the EPA relied on one</p> <p>12 upgradient well, right?</p> <p>13 MR. TEBBUTT: Objection to the extent it</p> <p>14 mischaracterizes the record.</p> <p>15 A. I believe there were more than that</p> <p>16 upgradient wells.</p> <p>17 Q. How many do you believe there were?</p> <p>18 A. I thought -- I would have to go back but I</p> <p>19 thought it was a handful.</p> <p>20 Q. Do you think that's in your report? I'm</p> <p>21 happy to walk through it with you if you like?</p> <p>22 A. No. I don't know whether it was in the</p> <p>23 reading of the hydrologist expert opinion or the EPA</p> <p>24 report, but what sticks in my mind is that there were</p> <p>25 several upgradient well samples.</p>	<p style="text-align: right;">Page 61</p> <p>1 multiparameter testing, right?</p> <p>2 A. Yes.</p> <p>3 Q. And those 25 were the highest nitrates of</p> <p>4 the 67, were they not?</p> <p>5 A. Yes.</p> <p>6 Q. Okay, so when the EPA compares those 25</p> <p>7 wells to the, as you recall it, a handful of</p> <p>8 upgradient wells they already knew what the results</p> <p>9 were, right?</p> <p>10 MR. TEBBUTT: Objection.</p> <p>11 Q. They had actually selected wells that they</p> <p>12 knew were the highest testing wells in the lower</p> <p>13 valley, right?</p> <p>14 MR. TEBBUTT: Objection, calls for</p> <p>15 speculation.</p> <p>16 Q. Right?</p> <p>17 A. You know, I -- this isn't about random</p> <p>18 sampling.</p> <p>19 Q. Right. It's about targeted sampling.</p> <p>20 A. But when you're trying to characterize an</p> <p>21 exposure, if, as some of my colleagues do, we are</p> <p>22 looking at, there is a real serious problem with the</p> <p>23 HIV, HIV epidemic, that an increasing number of young</p> <p>24 MSMs, men having sex with men, we do not know their</p> <p>25 HIV status, so the state health department through its</p>



<p style="text-align: right;">Page 62</p> <p>1 surveillance program does what is called oversampling. 2 It's a perfectly legitimate statistical methodology, 3 where you think you know where the problem is then you 4 go and oversample in that population to be sure that 5 you get a sufficient number. 6 So not being a hydrologist, it still makes 7 sense to me that if I were overseeing a project 8 conducted by the EPA and concerned about exceedances 9 of the MCL in well water, I would go back to the 10 places where that exceedance had occurred and collect 11 as much additional information, try to find out 12 whether it's an episodic contamination, whether it's 13 repeated, sample over time and all those other things. 14 So that's -- it has nothing to do with the 15 old saw about the inebriated person looking for his 16 lost car keys under the streetlight, and the policeman 17 said where did you lose them. I lost them over there. 18 Why are you looking over here? Because the light's 19 better. 20 That's not the issue here. The issue is 21 you go back to where you have a problem and you 22 explore it in greater depth. 23 Q. I totally appreciate that. And again, we 24 have had a couple of discussions off the record that 25 we have been meaning to have on the record about the</p>	<p style="text-align: right;">Page 64</p> <p>1 agricultural practices except in a general way I know 2 that the overapplication of animal waste in CAFOs and 3 the overapplication of synthetic nitrogen fertilizers 4 in grow cropping in the midwest is a big problem for 5 the environment and ultimately for human health. 6 But beyond that the details of why the EPA 7 did or did not sample from the other 22,000 wells in 8 the Yakima Valley, I really don't have any information 9 on that. 10 Q. I appreciate that, and I'm not trying to 11 create topics on which you are not offering an opinion 12 and then trying to attack the opinion you're not 13 giving. 14 But when an expert of your stature and your 15 expertise tells the judge that the -- or if an expert 16 of your stature and expertise tells the judge that the 17 EPA report is a valid exercise of science, that 18 carries a tremendous amount of weight. And that's why 19 I want to explore the basis of the opinion. 20 If you simply say I'm accepting it as true 21 for the purposes of my report, or that I defer to the 22 EPA and other experts on causation, that's one thing. 23 But saying I find it to be a valid reliable conclusion 24 of causation, I think is something different. 25 Are you with me there?</p>
<p style="text-align: right;">Page 63</p> <p>1 distinction between trying to track down a public 2 health concern and responsibly address a public health 3 concern, and proving causation in a federal courtroom. 4 I would suggest to you that those are 5 different things. And so for when we talk about 6 targeted sampling versus any type of stratified random 7 sampling or random sampling at all, I'm trying to get 8 at the reliability of this report. Okay? So let's 9 back up. 10 We know that there were 331 wells selected 11 and they were selected because of a predisposition or 12 presumption, or as a lawyer I would call it bias, that 13 there were likely to be concerns in the area of 14 dairies, right? Are you aware of any random sampling 15 that was done in areas that were not near dairies? 16 A. I'm not aware, but I do want to remind you 17 that I was asked to render an opinion, a judgment, 18 about whether or not these high levels of nitrate 19 constituted a public health threat. 20 Q. Correct. 21 A. And I already stated that I'm deferring to 22 the experts in hydrology and so on to deal with issues 23 of movement and so forth. 24 I have not looked at the rest of the Yakima 25 Valley. I don't have any sense of what kind of other</p>	<p style="text-align: right;">Page 65</p> <p>1 A. Yes. 2 MR. MONAHAN: Let's go off the record. 3 (Recess taken -- 10:39 a.m.) 4 (After recess -- 10:54 a.m.) 5 MR. MONAHAN: All right, ready to go back 6 on. 7 BY MR. MONAHAN: 8 Q. So, doctor, we have gone a little bit round 9 and round on the issue of how far your opinion may go 10 regarding the reliability of the EPA report, and I am 11 concerned that we may be talking past each other to a 12 certain level. And, again, my concern is 13 distinguishing between what a public health expert 14 like yourself may customarily and traditionally rely 15 on for the purposes of addressing public health risks 16 and what an expert witness may rely upon for the 17 purposes of offering expert testimony to a reasonable 18 degree of scientific certainty in a courtroom. So I'm 19 going to see if I can't parse this down a little 20 further. 21 As I understand it, the EPA report in this 22 case is the type of public agency document and report 23 that you traditionally rely upon in carrying out your 24 duties as a public health expert and in assessing and 25 addressing public health risks, right?</p>



<p style="text-align: right;">Page 66</p> <p>1 A. Yes.</p> <p>2 Q. But in terms of rolling up your sleeves and</p> <p>3 assessing all of the specific elements of the EPA</p> <p>4 report regarding its statistical modeling, for</p> <p>5 example, hydrological conclusions, things like that,</p> <p>6 you're not offering an opinion as to whether or not</p> <p>7 those meet any specific scientific standard, right?</p> <p>8 A. That's correct.</p> <p>9 Q. Would you agree with me that if one wanted</p> <p>10 to conclude to a reasonable degree of scientific</p> <p>11 certainty that the Cow Palace manure management</p> <p>12 operations were the source of elevated nitrates in any</p> <p>13 particular well one would want to know whether, for</p> <p>14 example, there were other sources of contamination for</p> <p>15 that well?</p> <p>16 MR. TEBBUTT: Objection, vague and</p> <p>17 ambiguous.</p> <p>18 Q. Do you understand the question, doctor?</p> <p>19 A. Try it again.</p> <p>20 Q. I'm trying. I'm putting on my judge hat</p> <p>21 here.</p> <p>22 A. Yes.</p> <p>23 Q. And if I'm the judge or the finder of fact,</p> <p>24 whomever that may be, and I'm trying to determine</p> <p>25 whether or not the Cow Palace was the source of</p>	<p style="text-align: right;">Page 68</p> <p>1 Q. I can go through the Trainor report with</p> <p>2 you if you'd like, doctor.</p> <p>3 A. Just tell me the level.</p> <p>4 Q. 10, 11, 12, parts per million?</p> <p>5 MR. TEBBUTT: Again, objection, vague and</p> <p>6 ambiguous.</p> <p>7 Q. Does that square with your recollection?</p> <p>8 A. Yes.</p> <p>9 Q. Okay.</p> <p>10 Do you have any opinions as to the source</p> <p>11 of nitrates for elevated nitrates in the AOC</p> <p>12 upgradient well DC 01?</p> <p>13 A. No.</p> <p>14 But, as I said before, there is a lot going</p> <p>15 on in the Yakima Valley. When you see what might be</p> <p>16 an outlier, without more data it would be hard to</p> <p>17 interpret that single upgradient well, which is</p> <p>18 already lower than most of the 66 downgradient wells</p> <p>19 that the EPA report focused on.</p> <p>20 Q. But higher than the 264 downgradient wells</p> <p>21 that had MCL levels below that 10, right?</p> <p>22 A. Yes.</p> <p>23 Q. So, I mean, this is just my whole concern</p> <p>24 about the statistical modeling. When we cherry pick</p> <p>25 67 wells out of 24,000 with a -- and we are beginning</p>
<p style="text-align: right;">Page 67</p> <p>1 elevated nitrates in a given well, and I'm listening</p> <p>2 to medical or scientific experts, wouldn't you agree</p> <p>3 it would be relevant whether or not there were other</p> <p>4 sources of contamination on that well?</p> <p>5 A. Yes, but as a nonhydrologist, I look at a</p> <p>6 map like this, and there were seven upgradient wells,</p> <p>7 not six as I had estimated. And I see that the well</p> <p>8 is right in the center of a map that shows that this</p> <p>9 is the Cow Palace operation, its fields, its barns and</p> <p>10 so forth. I probably wouldn't look too far for other</p> <p>11 sources of contamination.</p> <p>12 Q. You wouldn't.</p> <p>13 A. No.</p> <p>14 Q. Okay.</p> <p>15 You did read the Trainor report, did you</p> <p>16 not?</p> <p>17 A. Yes.</p> <p>18 Q. And you know that under the AOC there was a</p> <p>19 new well drilled upgradient or north and east of the</p> <p>20 Cow Palace Dairy, right? Right?</p> <p>21 A. Yes. Yes.</p> <p>22 Q. And you're aware that that upgradient well</p> <p>23 tested for elevated levels of nitrates, right?</p> <p>24 MR. TEBBUTT: Objection to the extent it</p> <p>25 mischaracterizes the record.</p>	<p style="text-align: right;">Page 69</p> <p>1 with the bias that the dairies are the cause, aren't</p> <p>2 we just confirming our own bias?</p> <p>3 MR. TEBBUTT: Objection, compound and</p> <p>4 mischaracterizes prior testimony.</p> <p>5 A. I would say that the sampling in this area</p> <p>6 on the map, and I don't know where those other 22,000</p> <p>7 are distributed, but I wouldn't regard that as cherry</p> <p>8 picking. I think that's a mischaracterization of what</p> <p>9 a stratified random sample would be about.</p> <p>10 Not knowing the hydrology, not knowing the</p> <p>11 details of water flow, et cetera, it doesn't surprise</p> <p>12 me to see a few aberrant data points. That's the</p> <p>13 reality of the statistical world in which we often</p> <p>14 operate.</p> <p>15 Q. Are 264 wells that test below 10 part per</p> <p>16 million aberrant data points in your opinion?</p> <p>17 MR. TEBBUTT: Objection, incomplete</p> <p>18 hypothetical.</p> <p>19 A. The distribution of an elevated nitrate,</p> <p>20 the fact that there are a substantial number of wells</p> <p>21 with levels that exceed the MCL, that's what I was</p> <p>22 asked to focus on as a public health expert, and it</p> <p>23 continues to alarm me as a substantial threat to the</p> <p>24 health of the public.</p> <p>25 Q. So whether or not the prevalence of</p>



<p style="text-align: right;">Page 70</p> <p>1 contaminated wells, and by contaminated wells I mean</p> <p>2 wells with a nitrate level in excess of -- 10 or</p> <p>3 higher I should say, whether or not the prevalence of</p> <p>4 contaminated wells in the area that we have been</p> <p>5 discussing as downgradient of Cow Palace, is any</p> <p>6 higher than it might be in Moxee, Washington, Selah</p> <p>7 Washington, Harrah, Washington.</p> <p>8 You just don't know, do you?</p> <p>9 A. I don't know those places.</p> <p>10 Q. Don't you agree as a physician, and as a</p> <p>11 medical expert who has spent a lot of time in this</p> <p>12 field, that in order to determine to a degree of</p> <p>13 reasonable scientific certainty whether or not the Cow</p> <p>14 Palace was the source of the elevated nitrates we need</p> <p>15 more data?</p> <p>16 Don't we need to know what the prevalence</p> <p>17 of contaminated wells in other areas is, before we can</p> <p>18 draw causal connections?</p> <p>19 MR. TEBBUTT: Objection, compound. Vague</p> <p>20 and ambiguous. Incomplete hypothetical.</p> <p>21 A. I was asked to render an opinion on whether</p> <p>22 or not exceedances of the MCL was a public health</p> <p>23 threat and that's what I'm prepared to render a</p> <p>24 judgment about. I do rely on agency reports in my</p> <p>25 work, and if the EPA has reported that there is a</p>	<p style="text-align: right;">Page 72</p> <p>1 A. I do not.</p> <p>2 Q. Actually, do you know if it's a Ms. -- it's</p> <p>3 a Joanne Burkholder. Do you know if Ms. Burkholder is</p> <p>4 a physician or M.D.?</p> <p>5 A. I don't.</p> <p>6 Q. Have you done any analysis on her report to</p> <p>7 render an opinion as to its reliability or scientific</p> <p>8 validity?</p> <p>9 A. Similar to my comment about EPA, I'm very</p> <p>10 familiar with Environmental Health Perspectives.</p> <p>11 Several of my colleagues have published in that</p> <p>12 journal in recent years.</p> <p>13 I know they have a very tight editorial</p> <p>14 policy, so I tend to accept their peer-reviewed</p> <p>15 publications as sound.</p> <p>16 Q. Is the Burkholder report peer-reviewed?</p> <p>17 A. Yes.</p> <p>18 Q. What is the -- do you know anything about</p> <p>19 the reports that were performed by Dr. Burkholder for</p> <p>20 the purposes of the conclusions that she reached?</p> <p>21 A. As best I recall from the paper it was a</p> <p>22 series of actual measurements of water in and around</p> <p>23 various CAFOs.</p> <p>24 Q. Okay. Are you aware of whether it included</p> <p>25 any actual medical diagnoses where specific adverse</p>
<p style="text-align: right;">Page 71</p> <p>1 significant problem that they have found in</p> <p>2 relationship to the three large dairies, I have no</p> <p>3 reason not to believe their recommendations.</p> <p>4 Q. Okay. Fair enough.</p> <p>5 Let's look at Paragraph 15 -- actually, I'm</p> <p>6 sorry just so we are clear on the record -- don't lose</p> <p>7 that -- you were referring to a map, doctor?</p> <p>8 A. Yes.</p> <p>9 Q. The map appears where?</p> <p>10 A. Figure 15, dairy cluster, total nitrogen</p> <p>11 concentration in water wells, lagoons, manure piles</p> <p>12 and application fields.</p> <p>13 Q. And is that page 30 of your report?</p> <p>14 A. That's Page 30 of my report.</p> <p>15 Q. Okay, thank you.</p> <p>16 Let's look at Paragraph 15 of your report.</p> <p>17 At Paragraph 15 and Paragraph 16 you talk about a</p> <p>18 number of studies that associate adverse health</p> <p>19 effects with varying degrees of nitrate contamination,</p> <p>20 right?</p> <p>21 A. Right.</p> <p>22 Q. You reference in particular, in a number of</p> <p>23 footnotes, the Burkholder report from 2007.</p> <p>24 A. Yes.</p> <p>25 Q. Do you know Dr. Burkholder?</p>	<p style="text-align: right;">Page 73</p> <p>1 health effects were determined by a physician because</p> <p>2 they were related to nitrate ingestion?</p> <p>3 A. No, I'm not aware.</p> <p>4 Q. In terms of the Yakima population, are you</p> <p>5 aware, doctor, of any adverse medical effects that</p> <p>6 have been determined by a physician to be causally</p> <p>7 related to the consumption of water with high nitrate</p> <p>8 levels?</p> <p>9 A. No.</p> <p>10 Q. We read a lot about, or I hear multiple</p> <p>11 references to blue baby syndrome. Are you, doctor,</p> <p>12 from your review of this case, aware of any blue baby</p> <p>13 syndromes that are causally related to consumption of</p> <p>14 water with elevated nitrate levels in the Yakima</p> <p>15 Valley?</p> <p>16 A. No.</p> <p>17 Q. You reference in Paragraph 16, and I</p> <p>18 believe later in the report, about a report on neural</p> <p>19 tube defects in the Yakima Valley --</p> <p>20 A. Yes.</p> <p>21 Q. -- and the fact that there are</p> <p>22 statistically higher neural tube defects in the Yakima</p> <p>23 Valley than elsewhere in Washington?</p> <p>24 A. Yes.</p> <p>25 Q. You are not, however, rendering an opinion</p>



<p style="text-align: right;">Page 74</p> <p>1 to a degree of reasonable medical certainty that the</p> <p>2 neural tube defects observed in Yakima County are</p> <p>3 causally related to consumption of water with elevated</p> <p>4 nitrates, are you?</p> <p>5 A. No, but I was putting on my former EIS,</p> <p>6 Epidemic Intelligence Service hat, that when you have</p> <p>7 clusters of unusual cases and there are known past</p> <p>8 associations of environmental exposures that have been</p> <p>9 connected to neural tube defects, it raises my general</p> <p>10 concern that this would be for more study and more</p> <p>11 research as opposed to saying that there is any</p> <p>12 definitive causative relationship established.</p> <p>13 Q. Understood.</p> <p>14 You referenced, you used the term chronic</p> <p>15 exposure a number of times in your report. Do you</p> <p>16 recall using that term?</p> <p>17 A. Yes.</p> <p>18 Q. When you talk about chronic consumption, I</p> <p>19 think, of water with elevated nitrates --</p> <p>20 A. Yes.</p> <p>21 Q. -- what does the term chronic mean?</p> <p>22 A. Repeated over time, multiple exposures.</p> <p>23 Q. How much time?</p> <p>24 A. It can range from weeks to years. We</p> <p>25 generally talk about chronic environmental exposure</p>	<p style="text-align: right;">Page 76</p> <p>1 Q. Okay, so if one, if a person in the</p> <p>2 geographic area covered by the EPA report were to</p> <p>3 consume water with the elevated levels of nitrates</p> <p>4 that are reported in the EPA report for a matter of</p> <p>5 months, you would consider that to be a chronic</p> <p>6 situation?</p> <p>7 A. Chronic exposure, yes.</p> <p>8 Q. Chronic exposure. Very good. All right.</p> <p>9 And in offering that opinion regarding</p> <p>10 chronic exposure under those circumstances, do you</p> <p>11 have an assumption as to the level of water one would</p> <p>12 customarily consume over this period?</p> <p>13 A. Depends whether it was summer, winter, a</p> <p>14 lot of other factors --</p> <p>15 Q. Okay.</p> <p>16 A. -- but generally people consume between a</p> <p>17 liter and three liters a day. Little difference,</p> <p>18 obviously, related to work activity, exercise levels,</p> <p>19 humidity, a lot of factors.</p> <p>20 Q. Other than ingestion of drinking water, is</p> <p>21 there any other manner in which the folks who live in</p> <p>22 this area might come into contact with water with</p> <p>23 elevated level of nitrates that would pose, in your</p> <p>24 opinion, a substantial and imminent threat to their</p> <p>25 health?</p>
<p style="text-align: right;">Page 75</p> <p>1 for people in a given geographic location or a given</p> <p>2 occupational exposure.</p> <p>3 Q. Well, with respect to the folks in the</p> <p>4 Yakima Valley and Lower Yakima Valley who are in the</p> <p>5 general geographic area covered by the EPA report, and</p> <p>6 given the level of nitrates that were found in the</p> <p>7 tests of their wells, in that context does chronic</p> <p>8 have any particular meaning for you?</p> <p>9 A. Yes. If you're -- we consume water every</p> <p>10 day. If you're predominantly, a predominant source of</p> <p>11 drinking water is from your household supply and that</p> <p>12 household supply is contaminated, then that would be a</p> <p>13 chronic exposure as opposed to an episodic exposure</p> <p>14 because you happen to be traveling to an area where</p> <p>15 you happen to be camping in the mountains and drinking</p> <p>16 from a stream that is contaminated by a beaver dam</p> <p>17 upstream.</p> <p>18 Q. I understand.</p> <p>19 But is there any particular time component</p> <p>20 of your definition of chronic given this context?</p> <p>21 A. Well, I guess I would -- when I said weeks</p> <p>22 to years --</p> <p>23 Q. Yes.</p> <p>24 A. -- I would probably put this into the frame</p> <p>25 of months to years.</p>	<p style="text-align: right;">Page 77</p> <p>1 A. It depends on the source of the drinking</p> <p>2 water. People are out working in the yard and they</p> <p>3 drink from the hose as opposed to getting a glass of</p> <p>4 water from the kitchen sink. Children playing in</p> <p>5 wading pools, running through a sprayer. There are</p> <p>6 multiple ways that people do get exposed to</p> <p>7 contaminated water. I assume that the major source of</p> <p>8 chronic exposure would be the actual water supply in</p> <p>9 the household.</p> <p>10 Q. Well, and again forgive me, my question is</p> <p>11 probably much more naive and uninformed than you</p> <p>12 suspect.</p> <p>13 What I'm trying to get at is, are there any</p> <p>14 health care risks associated with things like washing</p> <p>15 your hands, taking a shower, boiling a potato. Are</p> <p>16 those avenues by which elevated nitrates in the</p> <p>17 residential well water may pose a substantial and</p> <p>18 imminent threat to the affected families, or rather is</p> <p>19 your opinion limited to ingestion through drinking</p> <p>20 water?</p> <p>21 A. You gave three totally different examples.</p> <p>22 Q. Okay, help me break them down.</p> <p>23 A. Hand washing, nitrates do not get absorbed</p> <p>24 across the skin, so that's not a risk unless the</p> <p>25 person is in the habit of after rinsing, cupping the</p>



<p style="text-align: right;">Page 78</p> <p>1 water and taking a drink, which I have certainly done</p> <p>2 myself when I felt thirsty.</p> <p>3 Showering, some people do indeed rinse</p> <p>4 their mouth and swallow some water so that's a</p> <p>5 potential source of exposure.</p> <p>6 I'm not familiar with whether a boiled</p> <p>7 potato takes up nitrate from the water in which it is</p> <p>8 boiled, so I have to pass on that.</p> <p>9 Q. So at least from those three examples</p> <p>10 everything comes back to oral consumption of water.</p> <p>11 A. Yes.</p> <p>12 Q. When I read through the Pew Commission</p> <p>13 report and when I read through some of the other</p> <p>14 materials that you have cited that recognize or at</p> <p>15 least assert a connection between large animal</p> <p>16 feeding -- I'm trying to remember -- IFAP, industrial</p> <p>17 food animal production. In many of those instances</p> <p>18 there appears to be issues relating to fecal coliform</p> <p>19 and E-coli.</p> <p>20 A. Among other bacteria, yes.</p> <p>21 Q. Yes. Does it surprise you at all or does</p> <p>22 it have any significance to you that in this case the</p> <p>23 residences with the highest nitrate readings did not</p> <p>24 have any fecal coliform present?</p> <p>25 MR. TEBBUTT: Objection to the extent it</p>	<p style="text-align: right;">Page 80</p> <p>1 much concern in this case, to determine how long those</p> <p>2 nitrates have been in water?</p> <p>3 A. I'm not aware of a method, no.</p> <p>4 Q. In the conclusion of your report you talk</p> <p>5 about reverse osmosis systems?</p> <p>6 A. Yes.</p> <p>7 Q. From the perspective, from your perspective</p> <p>8 as an expert in this case who is testifying about</p> <p>9 public health risks associated with the presence of</p> <p>10 nitrates, is it fair to say that your concern, your</p> <p>11 health care concern would be alleviated by the</p> <p>12 installation of reverse osmosis in the homes that have</p> <p>13 elevated levels of nitrates?</p> <p>14 A. In preventive medicine we talk about</p> <p>15 primary, secondary and tertiary prevention.</p> <p>16 Q. Okay.</p> <p>17 A. Primary is you stop the problem before it</p> <p>18 emerges. You educate school aged children not to</p> <p>19 smoke.</p> <p>20 Secondary prevention, you screen people for</p> <p>21 presymptomatic conditions, Pap smears for cervical</p> <p>22 cancer, measuring blood pressure in the population to</p> <p>23 catch and begin treating early.</p> <p>24 Tertiary is what all of clinical medicine</p> <p>25 is about, trying to minimize the long-term impact.</p>
<p style="text-align: right;">Page 79</p> <p>1 calls for speculation.</p> <p>2 A. The pathways of movement of bacteria</p> <p>3 through water and soil is very, very different from an</p> <p>4 inorganic small molecule like nitrates, so it does not</p> <p>5 surprise me.</p> <p>6 Q. The EPA report had a section dedicated to</p> <p>7 water aging. Did you see that?</p> <p>8 A. Water?</p> <p>9 Q. Age dating?</p> <p>10 A. Age dating.</p> <p>11 Q. Did you read that part?</p> <p>12 A. I did not.</p> <p>13 Q. With all of your experience with Industrial</p> <p>14 Farm Animal Production facilities, have you ever</p> <p>15 encountered the concept of age dating water?</p> <p>16 A. No.</p> <p>17 Q. Do you have any idea, really, what it means</p> <p>18 or what purpose it is intended to serve?</p> <p>19 A. I don't.</p> <p>20 Q. Did the results of the age dating process</p> <p>21 in the EPA report have any impact whatsoever on the</p> <p>22 conclusions that you have reached in this case?</p> <p>23 A. No.</p> <p>24 Q. Do you know if it's possible, when one sees</p> <p>25 a nitrate result like the ones that have caused you so</p>	<p style="text-align: right;">Page 81</p> <p>1 I would say that reverse osmosis is a</p> <p>2 tertiary prevention measure. It's not satisfactory as</p> <p>3 a means of primary prevention. Primary prevention I</p> <p>4 would recommend as a public health person is to stop</p> <p>5 the production of nitrate flowing into the wells.</p> <p>6 There are some significant issues with reverse</p> <p>7 osmosis, and I speak more from the perspective of a</p> <p>8 public health person recognizing the human factor that</p> <p>9 is involved in so much of what we try to do to reduce</p> <p>10 risk.</p> <p>11 If the filter gets clogged and the flow of</p> <p>12 water begins to slow down, human nature suggests that</p> <p>13 the person will go to the tap in the bathroom to fill</p> <p>14 up the cooking pot rather than wait for the RO</p> <p>15 installed place to fill. So those are some of my</p> <p>16 general concerns.</p> <p>17 I did, after submitting my expert report,</p> <p>18 come upon a peer-reviewed article from South Africa,</p> <p>19 Nitrate, Nitrogen Removal with Small Scale Reverse</p> <p>20 Osmosis Electrodialysis and Ion Exchange Units in</p> <p>21 Rural Areas, and they were concerned about water</p> <p>22 quality in clinics and these were mostly in</p> <p>23 agricultural areas of the Limpopo Province. And they</p> <p>24 concluded that RO was, of the three, the most rugged</p> <p>25 and practical. So that's the good news.</p>



<p style="text-align: right;">Page 82</p> <p>1 The bad news was they had one case where</p> <p>2 repeated measures had 54 to 72 milligrams per liter of</p> <p>3 nitrate and the RO only was able to get it down to 12</p> <p>4 to 17. So it's not a panacea. It's harm reduction</p> <p>5 which -- in public health we often rely on harm</p> <p>6 reduction, so I would endorse RO as an intermediary</p> <p>7 step while organizing for primary prevention.</p> <p>8 Q. So if RO systems were installed into all of</p> <p>9 the affected households in the area under study in</p> <p>10 this case, that would be a first step, and it may</p> <p>11 reduce overall levels of nitrates, but it would not,</p> <p>12 from your perspective, eliminate the imminent</p> <p>13 substantial harm posed by the presence of nitrates in</p> <p>14 the groundwater?</p> <p>15 A. It would be a mitigating step, but not</p> <p>16 eliminate.</p> <p>17 Q. And if the Cow Palace was shuttered</p> <p>18 tomorrow and lagoons emptied, all spray activities</p> <p>19 ceased, pens scraped and so on, do you have any idea</p> <p>20 one way or the other how that may affect the presence</p> <p>21 of nitrates in groundwater over the next ten years?</p> <p>22 A. I would be speculating, but I think it's</p> <p>23 going to be a long, slow process. Unfortunately,</p> <p>24 that's what -- when you have contaminated groundwater,</p> <p>25 whether it's nitrates or atrazine or other resistant</p>	<p style="text-align: right;">Page 84</p> <p>1 A. We have seen in many circumstances, let's</p> <p>2 say part of the current debate with redefining the</p> <p>3 Clean Water Act now that the waters in the United</p> <p>4 States -- that excess phosphate from overapplication</p> <p>5 of synthetic fertilizers and phosphates has</p> <p>6 contributed to algal blooms in surface water, rivers,</p> <p>7 bays, estuaries off the Gulf of Mexico and these algae</p> <p>8 blooms, once the algae die as they soak up the oxygen,</p> <p>9 create these so-called dead zones where other</p> <p>10 oxygen-dependent species; fish, crustaceans, other</p> <p>11 plants, die.</p> <p>12 It's a broad systemic problem related to</p> <p>13 overapplication of phosphates and wherever it appears</p> <p>14 it interferes with the health of the ecosystem.</p> <p>15 Q. So are the excess phosphates that concern</p> <p>16 you the phosphates that you have seen in soil studies</p> <p>17 or in groundwater studies?</p> <p>18 A. In groundwater.</p> <p>19 Q. Okay, and what is the groundwater level of</p> <p>20 phosphate that you have seen that in your opinion</p> <p>21 triggers this substantial and imminent threat?</p> <p>22 A. Well, it's the -- phosphate shouldn't be</p> <p>23 present in water.</p> <p>24 Q. At all.</p> <p>25 A. At all.</p>
<p style="text-align: right;">Page 83</p> <p>1 organic pollutants from an industrial chemical site,</p> <p>2 that's why we work so hard to protect groundwater in</p> <p>3 aquifers.</p> <p>4 Q. So to answer my question whether there</p> <p>5 would be any measurable reduction, certainly in the</p> <p>6 short-term you just can't say?</p> <p>7 MR. TEBBUTT: Objection, calls for</p> <p>8 speculation.</p> <p>9 A. Can't say.</p> <p>10 (Discussion off the record.)</p> <p>11 (Lawrence Deposition Exhibit No. 321 was</p> <p>12 marked for identification.)</p> <p>13 MR. MONAHAN: Thank you for bringing the</p> <p>14 South Africa study to my attention, doctor, and we</p> <p>15 will make that part of the record today as</p> <p>16 Exhibit 321.</p> <p>17 BY MR. MONAHAN:</p> <p>18 Q. Doctor, you had earlier testified that the</p> <p>19 presence of phosphorus in the EPA test results</p> <p>20 constituted, in your opinion to a degree of reasonable</p> <p>21 scientific certainty, an imminent and substantial</p> <p>22 threat to the environment.</p> <p>23 A. Yes.</p> <p>24 Q. Can you please describe for me the basis of</p> <p>25 that opinion?</p>	<p style="text-align: right;">Page 85</p> <p>1 Q. At any level.</p> <p>2 A. No.</p> <p>3 Q. Okay, so in your opinion if phosphate</p> <p>4 appears in any water, that constitutes a substantial</p> <p>5 and imminent threat to the environment?</p> <p>6 A. It is an indicator that there is a problem</p> <p>7 of overapplication of fertilizer. And it is like the</p> <p>8 canary in the mine, if there is phosphate in the water</p> <p>9 we need to trace down its source and try to prevent</p> <p>10 further pollution.</p> <p>11 Q. Are you aware of any algal blooms occurring</p> <p>12 in the Lower Yakima Valley?</p> <p>13 A. No.</p> <p>14 Q. Are you aware of any of these dead zones</p> <p>15 that you have described anywhere in central</p> <p>16 Washington?</p> <p>17 A. No.</p> <p>18 Q. Is there -- in your opinion is the safe</p> <p>19 threshold for phosphates in water zero?</p> <p>20 A. I don't think -- I really haven't thought</p> <p>21 in terms of the safe threshold of phosphate. I would</p> <p>22 have to think about that.</p> <p>23 Q. Can you point me to the EPA test result</p> <p>24 that is the basis of your concern?</p> <p>25 A. Well, it was in the EPA report that</p>



<p style="text-align: right;">Page 86</p> <p>1 phosphate was -- I don't remember the exact levels, 2 however.</p> <p>3 Q. I'm going to take a minute and see if I can 4 find it. I just want to see what the number is, and 5 how that plays into your opinion.</p> <p>6 MR. MONAHAN: Off the record. 7 (Discussion off the record.)</p> <p>8 MR. MONAHAN: Back on the record.</p> <p>9 BY MR. MONAHAN:</p> <p>10 Q. Doctor, I have handed you -- not you, 11 doctor, the other doctor -- I have handed you a copy 12 of the EPA report titled Relation Between Nitrate and 13 Water Wells and Potential Sources in the Lower Yakima 14 Valley, Washington. It's the updated March 2013 15 report which Mr. Tebbutt and I both believe is already 16 an exhibit and if it is not we will cure that through 17 a subsequent entry.</p> <p>18 I have asked you, with the document in 19 front of you, to please identify for me the phosphorus 20 or phosphate test results that cause you concern and 21 are the basis of your opinion that phosphorus in 22 groundwater in Lower Yakima Valley constitutes a 23 substantial and imminent threat to the environment.</p> <p>24 MR. MONAHAN: Off the record. 25 (Discussion off the record.)</p>	<p style="text-align: right;">Page 88</p> <p>1 statement that animal waste has the potential to 2 contribute phosphorus to groundwater or surface water?</p> <p>3 A. Yes.</p> <p>4 Q. But in this case, as I understand it now, 5 you are unable to offer an opinion that there, in 6 fact, is phosphorus in the groundwater in the Yakima 7 Valley at the levels that would constitute to a 8 reasonable degree of medical and scientific certainty 9 a substantial and imminent threat to the environment?</p> <p>10 MR. TEBBUTT: Objection to the extent it 11 mischaracterizes testimony.</p> <p>12 A. I welcome the opportunity to go back 13 through in greater detail, but as of this point I have 14 not been able to identify that source of my opinion.</p> <p>15 Q. So if we go back through the EPA report and 16 are able to find an incident of a phosphorus, 17 phosphorus existing in the groundwater, is there a 18 level at which you believe the phosphorus would need 19 to be in order to trigger a substantial and imminent 20 threat to the environment?</p> <p>21 A. That is so geographic specific, so I would 22 have to say that where there is nitrogen, there is 23 going to be phosphorus. All we appear to have are 24 these elevated nitrate levels.</p> <p>25 If the phosphorus levels are consistent</p>
<p style="text-align: right;">Page 87</p> <p>1 MR. MONAHAN: Back on the record.</p> <p>2 BY MR. MONAHAN:</p> <p>3 Q. Doctor, you have now had a few minutes to 4 review the 2013 EPA report. I've been looking through 5 it myself as well, trying to find references to tests 6 for phosphorus.</p> <p>7 Have you been able to find anything?</p> <p>8 A. No. The only reference that I see is F5 in 9 the appendix, a general statement about contaminants 10 such as nutrients, nitrogen or phosphorus. And I 11 suspect what I am reflecting is the fact that in our 12 part of the country phosphorus is the big contaminant 13 from the poultry industry on the Eastern Shore, partly 14 related to the way in which poultry but not cows 15 metabolize seed containing, feed containing 16 phosphorus. And chicken liver is very, very high in 17 phosphorus.</p> <p>18 It is applied on agricultural fields, runs 19 off and is a really significant problem here and it is 20 a significant problem in the midwest, Mississippi 21 Valley and down into the Gulf of Mexico. But I can't 22 find anything specific in this report --</p> <p>23 Q. Okay.</p> <p>24 A. -- other than that reference.</p> <p>25 Q. The reference in F5 is just the general</p>	<p style="text-align: right;">Page 89</p> <p>1 with the nitrate levels then yes, I would say that is 2 a threat to the ecosystem.</p> <p>3 Q. What would consistent be, because there is 4 no MCL for phosphorus, is there?</p> <p>5 A. No.</p> <p>6 Q. So what do you mean by consistent?</p> <p>7 A. The reason there is no MCL for phosphorus 8 is we are really now talking about environmental 9 rather than human health ingestion.</p> <p>10 Q. I understand, but when you say that there 11 are levels consistent with nitrates, the nitrates in 12 many of these tests are 4, 5, 6, 7 times beyond what 13 the EPA considers safe --</p> <p>14 A. Right.</p> <p>15 Q. -- for human consumption?</p> <p>16 A. My point is phosphorus generally trends 17 with nitrogen since they are both products of the same 18 agricultural practices.</p> <p>19 Q. Is there a part per million threshold that 20 you have in mind?</p> <p>21 A. No.</p> <p>22 MR. TEBBUTT: Off the record. 23 (Discussion off the record.)</p> <p>24 MR. MONAHAN: Let's go back on the record.</p> <p>25 BY MR. MONAHAN:</p>

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<p style="text-align: right;">Page 90</p> <p>1 Q. Doctor, my trusty assistant Mr. Tebbutt has</p> <p>2 helped us locate in the EPA report some test results</p> <p>3 that do indicate the presence of phosphorus starting</p> <p>4 at Table C6, which is the Phase 3 Analytical Results</p> <p>5 for Major and Minor Ions and Trace Inorganic Elements</p> <p>6 in Wells, Dairy Lagoons and Wastewater Treatment Plant</p> <p>7 Influent.</p> <p>8 Do you see that?</p> <p>9 A. Yes.</p> <p>10 Q. And it looks like the phosphorus total in</p> <p>11 the upgradient well is .0292. Do you see that?</p> <p>12 A. Milligrams per liter, yes.</p> <p>13 Q. And in the dairy supply well .0926</p> <p>14 milligrams per liter. Do you see that?</p> <p>15 A. Yes.</p> <p>16 Q. And then there are also a range of other</p> <p>17 values for downgradient or what are characterized as</p> <p>18 downgradient and upgradient wells.</p> <p>19 I will ask you at the outset, does the</p> <p>20 presence of phosphorus in the upgradient wells cause</p> <p>21 you concern?</p> <p>22 A. Yes. I think phosphorus as a contaminant</p> <p>23 of water is the essence of the environmental threat.</p> <p>24 Q. And are these levels, where we are talking</p> <p>25 less than one-tenth of one part per million, are those</p>	<p style="text-align: right;">Page 92</p> <p>1 operations, what would concern me more are the</p> <p>2 substantial amounts of phosphorus that are being</p> <p>3 applied in the fields and so on. But from the</p> <p>4 groundwater perspective, I would have to dig deeper</p> <p>5 because this is not an area of my expertise in terms</p> <p>6 of how significant the level ought to be before you</p> <p>7 start worrying about it in groundwater.</p> <p>8 Q. At least from looking at it in Table 6 it</p> <p>9 appears that phosphorus is appearing both upgradient</p> <p>10 and downgradient?</p> <p>11 A. Yes.</p> <p>12 Q. So to close my loop, you are not prepared</p> <p>13 to say today that Cow Palace's operations are</p> <p>14 introducing phosphorus into the Yakima Valley</p> <p>15 groundwater at levels that, in your opinion, to a</p> <p>16 degree of reasonable scientific certainty, pose an</p> <p>17 imminent and substantial threat to the environment,</p> <p>18 correct?</p> <p>19 A. I would like to reserve judgment about that</p> <p>20 until I dug a little deeper because, quite honestly,</p> <p>21 this is not an area that I focused on in preparing my</p> <p>22 report. It does seem as though these are very low</p> <p>23 levels, but we do know that in nature sometimes very</p> <p>24 low levels cause big problems. So I would defer my</p> <p>25 response to that.</p>
<p style="text-align: right;">Page 91</p> <p>1 at the level that you would consider to be consistent</p> <p>2 with the nitrate levels that we are seeing in this</p> <p>3 report?</p> <p>4 A. Well, if you look on Page 3 of 7, well 21,</p> <p>5 it's 0.101, and if you then look also at -- we would</p> <p>6 have to go to another table to find the nitrate for</p> <p>7 that well.</p> <p>8 Q. In looking at these levels, doctor, and</p> <p>9 seeing that -- I apologize I haven't studied these</p> <p>10 before this morning -- but with the exception of one</p> <p>11 well that is characterized as downgradient, I don't</p> <p>12 see any others where the presence of phosphorus</p> <p>13 exceeds one-tenth of one part per million, do you?</p> <p>14 A. Other than the open cesspits labeled dairy</p> <p>15 lagoon 01, 02, 03, 04, 05 on Page 47 --</p> <p>16 Q. It shouldn't surprise us to see phosphorus</p> <p>17 in a wastewater management lagoon, would it?</p> <p>18 A. No. And those -- it's the application of</p> <p>19 phosphorus in those concentrations that creates the</p> <p>20 environmental threat. So I'm making a distinction</p> <p>21 between groundwater presence and the fact that you</p> <p>22 have this phosphorus load in the Yakima Valley. And I</p> <p>23 would reframe my earlier responses to say that in</p> <p>24 terms of a general observation about protection of the</p> <p>25 environment from concentrated animal feeding</p>	<p style="text-align: right;">Page 93</p> <p>1 Q. However, today you haven't seen enough</p> <p>2 information that would allow you to render that</p> <p>3 opinion, correct?</p> <p>4 A. Correct.</p> <p>5 MR. MONAHAN: Let's go off the record.</p> <p>6 (Discussion off the record.)</p> <p>7 (Recess taken -- 11:59 a.m.)</p> <p>8 (After recess -- 12:06 p.m.)</p> <p>9 BY MR. MONAHAN:</p> <p>10 Q. Doctor, you and I have spoken to some</p> <p>11 degree about the Pew Commission on Industrial Farm</p> <p>12 Animal Production and the report where you acted as an</p> <p>13 investigator and were one of the editors?</p> <p>14 A. Yes.</p> <p>15 Q. I thought I would complete the record by</p> <p>16 making that an exhibit.</p> <p>17 If you can confirm for me that what I'm</p> <p>18 handing you is, in fact, the Pew report, I will make</p> <p>19 that Exhibit 322.</p> <p>20 A. Yes, it is.</p> <p>21 (Lawrence Deposition Exhibit Number 322 was</p> <p>22 marked for identification.)</p> <p>23 BY MR. MONAHAN:</p> <p>24 Q. And as long as we have it, this is the</p> <p>25 document with which you agree with its findings and</p>



<p style="text-align: right;">Page 94</p> <p>1 conclusions --</p> <p>2 A. Yes.</p> <p>3 Q. -- as well as its recommendations for what</p> <p>4 should be done with respect to CAFOs and other IFAPs,</p> <p>5 right?</p> <p>6 A. Yes.</p> <p>7 Q. Look at Page 29, if you would. At least I</p> <p>8 thought it was 29. It talked about the statement from</p> <p>9 Ms. Reddout?</p> <p>10 A. Yes.</p> <p>11 Q. At the bottom of Page 29 there is a brief</p> <p>12 narrative about a story told to the commission by</p> <p>13 Ms. Reddout, and I just want to confirm from you that</p> <p>14 in fact that information would have been provided to</p> <p>15 the commission by Ms. Reddout sometime before the end</p> <p>16 of 2008.</p> <p>17 A. That's correct. Well, actually, sometime</p> <p>18 before April of 2008 because the report was released</p> <p>19 in early May of 2008.</p> <p>20 Q. The report references water testing that</p> <p>21 Ms. Reddout had performed, and I don't have the report</p> <p>22 in front of me, doctor. I'm sorry, you will have to</p> <p>23 help me with the verbiage, but I believe it says that</p> <p>24 there were elevated levels of nitrates -- excuse me.</p> <p>25 Let me be precise. "Subsequent tests revealed that</p>	<p style="text-align: right;">Page 96</p> <p>1 A. The first thing I would do would be to</p> <p>2 speak with Robert Martin who was the executive</p> <p>3 director of the Pew Commission.</p> <p>4 Q. Do you know where he is now?</p> <p>5 A. He works for the Center for a Liveable</p> <p>6 Future. He directs our food system policy and public</p> <p>7 health program.</p> <p>8 Q. So when you say you talked to him you might</p> <p>9 run into him in the hallway?</p> <p>10 A. Two doors down.</p> <p>11 Q. Okay.</p> <p>12 A. And he is the repository of all details</p> <p>13 about the commission. He would know whether A, they</p> <p>14 were all recorded; and B, whether they were archived;</p> <p>15 and C, if so, where.</p> <p>16 Q. Very well.</p> <p>17 I would ask if you could make that inquiry</p> <p>18 and report back to Mr. Tebbutt?</p> <p>19 A. I will do that.</p> <p>20 Q. And I will follow up with Mr. Tebbutt.</p> <p>21 Paragraph 7A of your report --</p> <p>22 A. On Page?</p> <p>23 Q. On Page 5 about halfway down --</p> <p>24 A. Yes.</p> <p>25 Q. -- you state, "I have co-authored policy</p>
<p style="text-align: right;">Page 95</p> <p>1 her drinking well, Ms. Reddout's drinking well, was</p> <p>2 contaminated with nitrates."</p> <p>3 Do you see that?</p> <p>4 A. Yes.</p> <p>5 Q. As one of the editors of this report, do</p> <p>6 you know if the term contaminated was meant to convey</p> <p>7 that the well had in excess of ten parts per million</p> <p>8 of nitrates?</p> <p>9 MR. TEBBUTT: Objection to the extent it</p> <p>10 calls for speculation.</p> <p>11 A. I don't recall that discussion in the</p> <p>12 commission got to the levels of talking about MCL.</p> <p>13 Q. Were the testimonials provided by persons</p> <p>14 such as Ms. Reddout recorded?</p> <p>15 A. I believe they were.</p> <p>16 Q. Do you know if those recordings may still</p> <p>17 be archived someplace?</p> <p>18 A. They might be archived at The Pew</p> <p>19 Charitable Trusts.</p> <p>20 Q. Which is located where?</p> <p>21 A. In Washington, D.C.</p> <p>22 Q. So that is the first place you would look</p> <p>23 if you wanted to determine if in fact there still were</p> <p>24 archived recordings of materials presented by persons</p> <p>25 such as Ms. Reddout?</p>	<p style="text-align: right;">Page 97</p> <p>1 papers" and so on, end quote. I have looked through</p> <p>2 your CV and tried to identify policy papers that you</p> <p>3 are describing here in Paragraph 7A.</p> <p>4 A. Um-hmm.</p> <p>5 Q. And I'm unable to find anything other than</p> <p>6 perhaps the Pew Commission report. As you sit here</p> <p>7 today, doctor, can you identify for me policy papers</p> <p>8 that you have co-authored that describe the harmful</p> <p>9 effects of industrialization of agriculture as they</p> <p>10 pertain to degradation of air, water, et cetera?</p> <p>11 A. The Horrigan, Walker, Lawrence paper of --</p> <p>12 let me see when that would have been. About ten years</p> <p>13 ago. How Sustainable Agriculture Can Address the</p> <p>14 Environmental and Human Health Harms of Industrial</p> <p>15 Agriculture environmental reports.</p> <p>16 Q. You are reading from your CV?</p> <p>17 A. Yes.</p> <p>18 Q. What page, sir?</p> <p>19 A. Ten of Attachment A, last entry on that</p> <p>20 page.</p> <p>21 Q. Thank you.</p> <p>22 A. And by policy, a lot of the discussion</p> <p>23 section of papers and next step sections and so forth</p> <p>24 often get into policy recommendations, so the Walker</p> <p>25 Rhubart, Berg, McKenzie, Kellig, Lawrence, Public</p>



<p style="text-align: right;">Page 98</p> <p>1 Health Implications of Meat Production and</p> <p>2 Consumption, Journal of Public Health Nutrition, I</p> <p>3 would suspect that we had some comments in there, too,</p> <p>4 about the impact of meat production on human health.</p> <p>5 Q. Any other policy papers you can identify,</p> <p>6 doctor?</p> <p>7 A. I would be surprised if the Neff, Palmer,</p> <p>8 McKenzie, Lawrence paper on Page 9, Food Systems and</p> <p>9 Public Health Disparities, Journal of Hunger and</p> <p>10 Environmental Nutrition, didn't have some reference to</p> <p>11 it, but I can't recall precisely.</p> <p>12 Q. I'm afraid it feels like a quiz.</p> <p>13 A. No, I understand.</p> <p>14 Q. So those three you think would be the</p> <p>15 probable sources? Yes?</p> <p>16 A. Yes, and this is kind of the major --</p> <p>17 Q. The Pew Commission report?</p> <p>18 A. Right.</p> <p>19 Q. I read the letter and Phase 1 report that</p> <p>20 you wrote for the FDA.</p> <p>21 A. Yes.</p> <p>22 Q. -- in which you were identifying the best</p> <p>23 model to rank the risks associated with certain food</p> <p>24 products.</p> <p>25 A. Yes.</p>	<p style="text-align: right;">Page 100</p> <p>1 MR. MONAHAN: Yes.</p> <p>2 MR. TEBBUTT: Yes, I will take a copy.</p> <p>3 (Thereupon, signature having not been</p> <p>4 waived, the examination of ROBERT S. LAWRENCE, M.D.</p> <p>5 was concluded at 12:18 p.m.)</p> <p>6 - - - - -</p> <p>7</p> <p>8</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>
<p style="text-align: right;">Page 99</p> <p>1 Q. And that was Phase 1 of what was intended</p> <p>2 to be a multiphase project, right?</p> <p>3 A. Yes.</p> <p>4 Q. Were there ever any subsequent phases</p> <p>5 completed?</p> <p>6 A. Yes. The Phase 2 report was also published</p> <p>7 by the National Academy of Press, I would guess</p> <p>8 something like two years after the Phase 1 report,</p> <p>9 maybe not quite two years.</p> <p>10 Q. Did you participate in Phase 2?</p> <p>11 A. Yes, I chaired that committee. Let me see</p> <p>12 if I can quickly find it -- on Page 20. So the Letter</p> <p>13 report, second from the bottom --</p> <p>14 Q. That's the one I read.</p> <p>15 A. -- and then the one above that, A Risk</p> <p>16 Characterization Framework for Decisionmaking with the</p> <p>17 Food and Drug Administration is the final report.</p> <p>18 Q. Thank you. Very good.</p> <p>19 MR. MONAHAN: I thank you for your time and</p> <p>20 your patience. You have answered all the questions I</p> <p>21 have today.</p> <p>22 THE WITNESS: Thank you.</p> <p>23 THE REPORTER: Would you like a copy.</p> <p>24 MR. TEBBUTT: Yes.</p> <p>25 Are you ordering?</p>	<p style="text-align: right;">Page 101</p> <p>1 UNITED STATES OF AMERICA)</p> <p>2 STATE OF MARYLAND)</p> <p>3</p> <p>4 I, CAPPY HALLOCK, the reporter before whom</p> <p>5 the foregoing deposition was taken, do hereby certify</p> <p>6 that the witness whose testimony appears in the</p> <p>7 foregoing deposition was sworn by me; that said</p> <p>8 deposition is a true record of the testimony given by</p> <p>9 said witness.</p> <p>10 I further certify that I am neither counsel</p> <p>11 for, related to, nor employed by any of the parties to</p> <p>12 the action in which this deposition was taken; and</p> <p>13 further that I am not a relative or employee of any</p> <p>14 attorney or counsel employed by the parties hereto, or</p> <p>15 financially or otherwise interested in the outcome of</p> <p>16 this action.</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22 _____</p> <p>23 Cappy Hallock, RPR, CRR, CLR</p> <p>24 My Commission expires January 19, 2017</p> <p>25</p>



<p>1 CHANGES IN FORM AND SUBSTANCE REQUESTED BE MADE IN THE FOREGOING ORAL EXAMINATION TRANSCRIPT:</p> <p>2</p> <p>3 (NOTE: If no changes desired, please sign and date where indicated below.)</p> <p>4</p> <p>5 PAGE LINE CORRECTION AND REASON</p> <p>6</p> <p>7</p> <p>8</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18 I, ROBERT LAWRENCE, M.D., hereby declare under penalty of perjury that I have read the foregoing deposition that the testimony contained therein is a true and and correct transcript of my testimony, noting the corrections above.</p> <p>19</p> <p>20</p> <p>21 ROBERT LAWRENCE, M.D.</p> <p>22 Date</p> <p>23</p> <p>24 See: Wash. Reports 34A, Rule 30(e) USCA 28, Rule 30(e) PLEASE RETURN TO: Central Court Reporting, P.O. Box 8029, Yakima, WA 98908</p> <p>25</p>	<p>Page 102</p>



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